Northwestern Birds

Their distribution and migrations in adjacent Alaska and British Columbia

By Harry S. Swarth

Introduction.

My theme is found in the ~~bird life~~ avifauna of a section of northwestern North America; it is concerned with the inter-relations and distribution of the birds of the south-eastern ~~Alas~~ portion (the "panhandle") of Alaska and the neighboring interior of British Columbia. Here is to be seen the curious accident of a political boundary coinciding ~~as~~ exactly ~~as maybe with as~~ that is as trenchant ~~trenchant~~ with a faunal boundary as any to be found in North America. In this part of ~~the North America~~ the continent, Atlantic coast-birds press (nearly ~~almost~~ to the Pacific, to points that westward ~~to within sight almost of the~~ are almost within sight of the western sea. ~~Pacific~~

The ~~west~~ Pacific avifauna is correspondingly

restricted to an extremely limited coastal area.

These facts in a general way are, of course, common knowledge, but there has never been a thorough-going presentation of conditions with details of each species ~~the facts~~ and with resulting deductions.

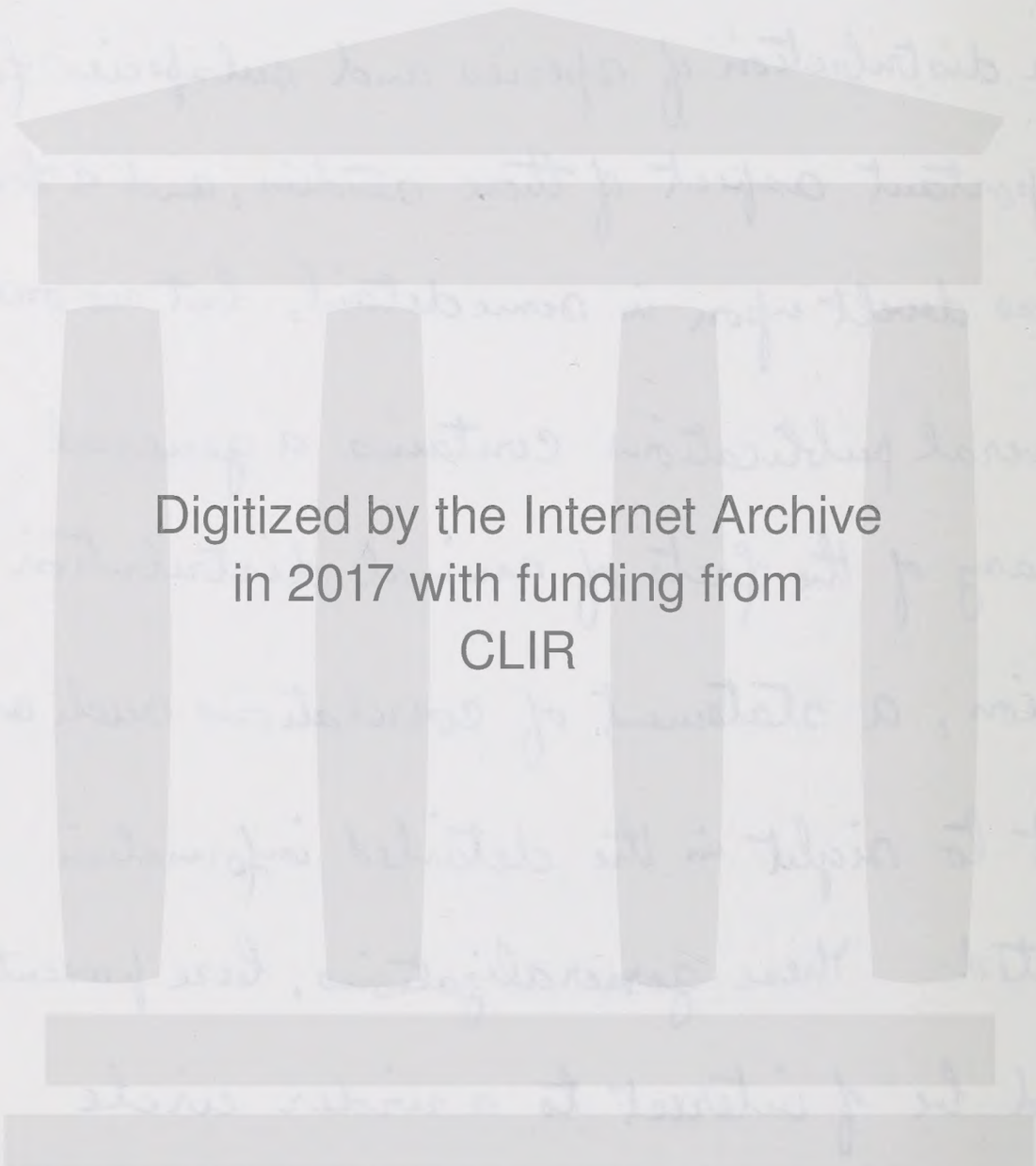
The boundaries that define alike the habitats of large numbers of species, thus forming "faunal areas," the nature of the species concerned, their origin and relationships, the occasional aggressive species that we can see are pressing ~~on~~ onward past the barrier that halts most of ~~the~~ their associates, and the conditions that ~~these~~ such pioneers are encountering, all these form the subject-matter of the following pages, presented, I hope, so as to have retained some portion of the interest that attained in the original observations.

These facts and theories ~~presented in these pages~~ are based mostly upon the results of ~~had their origin in~~ a series of summer trips that I made, first for the Museum of Vertebrate Zoology of the University of California, then for the California Academy of Sciences. The primary object of these expeditions was the ~~collecting~~ gathering of series of specimens of birds and mammals for the museum collections, ~~with~~ supplemented by such written observations upon the species as lay within the capability of the collector.

Song summers were spent upon the coast of Southeastern Alaska (1909), on Vancouver Island (1910), in the Stikine River region of British Columbia and Alaska (1919), in the upper Skeena Valley (1921), and in the Atlin region (1924, 1929). The

resulting collections, totalling about 4000 birds and 2500 mammals, formed the bases for a series of published reports that were concerned mostly with the systematic questions involved.

The distribution of species and subspecies formed an important aspect of those studies, and a feature that was dwelt upon in some detail, but no one of the several publications contains a general summary of the facts of animal distribution in the region, a statement of correlations such as may be lost to sight in the detailed information presented. These generalizations, here presented, should be of interest to a wider circle that that formed by specialists in systematic studies. The subject has not been treated in any general work on ornithology.



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~~only~~
~~systematic studies~~

The observer of birds for the pleasure of it, ~~will~~ if he ~~has~~ chances to visit this region, and it does attract thousands of tourists each year, can direct his observations to better purpose when he understands the meaning of the many puzzling and seemingly contradictory occurrences that he will encounter. The student of other phases ~~of subjects~~ of natural history may be able ~~trace relationships between these~~ to apply some of these observations in his own field.

Introductory chapters are descriptive of the Bitlean district on the coast, of the Cassiar and Omineca districts inland, these terms being applied to defined faunal areas, and the descriptive matter ~~dealing~~ ~~is~~

~~Concerned with~~ covering such aspects of the ~~country~~ surroundings as obviously affect ~~the~~ bird life. The chapters dealing with ~~the~~ groups of bird species are each ~~headed with a list~~ preceded by a list of the species in ~~that~~ the groups. These lists are in parallel columns, pertaining respectively to coast- and interior, with the species or subspecies that ~~replace each other~~ are complementary in the two regions placed opposite. The richness or poverty of the region so far as that bird group is concerned, and the condition of possible "ecologic niches", so-called, ~~voluntary~~ perhaps crowded, perhaps unoccupied, are thus made apparent. In these lists the scientific names of the birds are used, in the text the English names throughout.

The elementary nature of explanatory statements in the ~~section~~ dealing with life zones and faunal areas is due to the hope that the publication might be used by ~~many~~ readers to whom these concepts are unknown or only vaguely understood.

The "Sitkan district" of southeastern Alaska received that name from E.W. Nelson, who, in 1887, published his "Report upon Natural History Collections made in Alaska", in which the physical characteristics and the biological peculiarities of that immense territory were described with such accuracy, at least as to their ~~most~~ salient features, as to leave for later observers but little more than the filling in of details. The Sitkan district extends north from Dixon Entrance (the southern boundary of Alaska) at least to Skagway. Nelson's definition of the region carried it on as far as the base of the Alaska Peninsula, but later writers have been inclined to restrict it as indicated. It includes the extremely narrow strip of mainland coast that lies west of the crest of the coastal mountains (of an average width of perhaps

~~than~~ thirty or forty miles), together with and the numerous islands, large and small (the Alexander Archipelago) that lie to the westward.

The outstanding feature of the region (one that the most casual observer can not overlook) is the tremendous rainfall. This country ~~it~~ comprises the wettest part of the northwestern rain-belt, with the average annual precipitation at different points (there is considerable local variation) ranging from ~~too~~ 75" inches to 200 inches, or perhaps even more. ~~Heavy~~ Constant rains of summer are followed by heavy snowfall in winter. The blame for ~~the explanation of~~ this climatic feature may be divided between the Japan current and the ~~lies in the~~ mountain barrier that lines the coast, a tremendous wall, rising abruptly from the sea and attaining heights of 10,000 feet or more. The adjoining ~~sea~~ sea is relatively warm, ~~tempered by the Japan current that sweeps~~ The adjoining sea is relatively warm. ~~Alaskan coast~~, and this warmth affects the air above. The warm, moisture-laden sea breezes, pressing eastward, are abruptly cooled by the icy summits of the Coast-Ranges, and drop their watery content in the ~~well nigh perpetual~~ all but unceasing misty rain that is so characteristic of the country.

Immediately beyond the mountains (sometimes within 60 or 70 miles of the coast) the rainfall decreases abruptly, in many sections to not more than ten or fifteen inches annually. Overcast skies are not uncommon just east of the coast ranges, and ragged streamers of clouds may extend from ~~are caught on~~ jagged peaks, where, literally, they seem to be caught, and to hang helplessly until dissolved; but what would be threatening weather in most parts of the world may be disregarded here as ~~apt to result in rain~~ but a threatening gesture.

of the coastal regions.

¶ The heavy winter snows, presumably in past ages far in excess of what was carried away in the brief seasons of melting, have resulted in the vast ~~burden~~ deposits of glacial ice with which the mountains ~~tops~~ are burdened, for South-eastern Alaska is one of the ~~two or three~~ several great glacier covered areas of the earth, second only in extent to the ~~great~~ illimitable ice-fields ~~caps~~ of Greenland and Antarctica. ~~It will be a novel idea to many to have brought to their realization the fact~~ It is a well known fact that still needs repetition for realization, that the Alaskan glaciers are all in the southernmost part of that territory, and mostly well south of the Arctic Circle, while truly Arctic northern Alaska is entirely free of glaciers and ~~has~~ has been so for ages. We are told, and the evidence is there for all to read, that the glaciers of south-eastern Alaska are but the surviving remnant, retreating year by year, of a vastly greater ice-cap that once spread over ~~covered~~ much of western North America, from this center, ~~and that scoured out the channels~~ a glacial covering that was an important factor in scouring out the intricate network of channels that divides the islands of the Alexander Archipelago.

The coast ranges that ~~closely~~ border the shores of the Pacific ~~south~~ from central California northward, culminate ~~so the~~ in Alaska in a colossal series of jagged peaks and ridges, towering abruptly from depths below the water, This part of the range, literally, is not snow-capped in all its length, ~~but despite~~ though heights of 10,000 feet and ~~upward that are attained by but thrusts~~ lines of perpendicular cliffs and sharp-pointed, bare, granite summits are thrust upward far beyond the encircling weight of glacial ice and snow that hangs everywhere along the lesser heights, and that clogs ~~some~~ valleys and cañons ~~even~~ downward sometimes even to salt-water. This is mostly on the mainland. The islands, just as mountainous, do not attain such lofty elevations, and whereas the mainland summits, from their raw irregularities, appear never to have been ~~smoothed~~ subjected to the ~~smoothing~~ smoothing passage effect of the grinding ice-masses, the islands ~~mostly except~~ exhibit mostly a somewhat hummocky effect and ~~smoother~~ gently rounded outlines, ~~nearly all covered~~ forest-covered nearly everywhere. Treed, or almost- ~~the nearly~~ every island there are summits that

are snow covered perpetually, and on some of the ~~big~~ largest ~~ones~~, such as Baranof and Chichagof, these snow fields stretch for ~~many miles~~, tremendous distances, but, nevertheless, to the traveler on a passing steamer, going up or down the coast, the general effect is of a naked, harsh ~~jagged~~ and impassible barrier to the eastward of a milder setting of rounded hills and more gentle slopes, smothered with vegetation, on the surrounding islands off the coast.

North of Dixon Entrance the ~~masses~~ fields of glacial ice that must cover unbrokenly large sections of the unexplored mountain masses, and tongues downward to the sea, in increasing volume and frequency as one travels northward. Taku Glacier, on the west (near Juneau) and Sawellyn glacier on the east (on Atlin Lake) are but ~~different~~ names applied to different corners of one huge field of ice. Great Glacier and Mud Glacier, on the Stikine, and others, unnamed, that may be seen along the intervening coast, are undoubtedly all just projecting ~~ends~~ extremities radiating from another from the same great center.

The summers of the coast region are never very warm, nor the winters very cold, a climatic feature that is very different indeed to what prevails inland. The striking result of these peculiarities of temperature and rainfall is seen in the characteristic vegetation of the coast-belt, where forest-trees and undergrowth both attain an exuberance of growth that can be compared only to the jungles of the tropics. Only one who has struggled through these woods can realize how nearly impossible they are. Trees grow on every inch of ground that will support a tree, from mountain summits down to the water's edge. The forest's lower border is sharply defined, marked by one inflexible barrier, salt water. It is a fact that Here, meadows may be seen here and there back from the beach, sometimes of great area, grown with tall grass and entirely free of trees, but more than one inexperienced camper, using this easily available campsite, has been awakened at night by the invading saltwater tide within his tent. It may be only the occasional high spring tide that reaches that level, but one may feel assured that any such open meadow lies under salt water at some time, however unlikely it may seem.

The forested zone covers by far the greater part of the ~~country~~. The characteristic and dominant tree ~~of the~~ Sitkan district, here, and for many miles to the southward, is the Sitka Spruce (Picea sitchensis). From tide line upward to ~~the summits~~ timber line, over hill and valley, on ridges and along the rivers, this tree, with lesser admixtures of hemlock and cedar, grows in such density as to suggest nothing so much as a particularly thick pelaged fur. The view that meets one from a ~~deck of the~~ coastal steamer, day after day, is of an interminable series of vistas of dark green ~~hillsides~~ slopes covered with almost unbroken stands of conifers, ~~Sitka Spruce~~, the generally green coloration so thickly speckled with ~~the glaucous color of innumerable~~ gray dead trunks as to produce almost a pepper-and-salt effect. ~~The~~ Under favorable conditions some trees attain a height ~~Spruce trees seldom attain great size, the average~~ of 100, or even 150, feet, but ordinarily, in the ~~height perhaps~~ crowded forest that is most prevalent, the spruce ~~and they do not seem to be long lived.~~ trees are under 100 feet high. Judging from the abundant dead trees they would seem to be not very long lived; ~~the~~ perhaps the stony mountain sides or boggy valleys that form most of their habitat are ~~unfavorable~~ unequal to the support of really fine forest-trees.

The Western Hemlock (Tsuga heterophylla), less abundant than the ~~Spruce~~ ubiquitous spruce, grows in ~~some abundance~~ over much of the coastal

region. It is most conspicuous away from tide water, thriving in inland valleys and on mountains, sometimes to the exclusion of the spruce trees over considerable areas.

Both the Western Red Cedar (Thuja plicata) and the Yellow Cedar (Chamaecyparis nootkatensis) are fairly conspicuous features of the Alaskan woods, beautiful trees, often of great size. ~~forest trees of the coast,~~ ~~great size.~~ ~~And finally, of the conifers, there is the~~ Lodgepole Pine (Pinus contorta), of interest here in that it seems to lead a most precarious existence in this, one of the extreme outposts of its vast habitat. In the interior at the same latitude, (the "jack-pine" of local parlance) it covers considerable areas, sometimes in pure stands over square miles of territory, but on the coast it is found in stunted form growing in scattered trees over the wet and rather open "muskegs" or "parks" that characterize some of the islands. It is not easy to understand how these pines managed to push westward as they have done to occupy the scanty tracts suitable to their needs, where, in fact, they seem barely able to survive, but there they are, out clear to the westernmost edge of the Archipelago, as on ~~or some~~ Kodiak Island.

Along the beaches, just above high tide and bordering the forest, there is almost everywhere a line of alders (Alnus oregona and A. sitchensis both occur in the region) growing as dense, rounded bushes, the lower branches close to the ground. Marshy areas mixed with willows, may have extensive growths of this bush, the stiff crinkly branches of the alder, twisted and crushed down by winter snows, forming an exasperatingly difficult obstacle to be struggled through. Associated with the alder are thickets of salmon-berry (Rubus spectabilis), in late summer laden with ~~fruit~~ berries that are acceptable alike to man, bear, and bird, and also the highly objectionable devils'-club (Fatsia horrida). ~~(Echinopanax horridum)~~. This is a broad-leaved bush, with thick, fleshy stalks, erect clusters of red berries, the foliage green, glossy, and attractive — at a distance. Close contact reveals a truly diabolical array of thorns, on branches, twigs, and even on the undersides of the leaves, needle-sharp, prone to break off under the skin, and as poisonously painful as cactus spines. Any attempt to traverse the Sitkan forests must

take into account the inevitable presence of this frightful shrub, a final straw added to the difficulties of densely crowded ~~living~~ trees, sprawling and tangled deadfalls, moss-hidden rock piles, and the persistant hindrance ~~to~~ of the closely woven alders — all dripping water in gentle but penetrating streams. An attractive bush, most abundant on the mainland coast, is the Red-berry Elder (Sambucus racemosa) its gleaming fruit adding a touch of brilliant color to the generally rather somber woods. The larger rivers of the mainland, notably the Stikine, are bordered by groves of tall cottonwoods (Populus trichocarpa), which ~~are~~ growing rapidly on treacherous bottom-lands where shifting streams uproot hundreds of them every year and sweep the fallen 'giants' ~~trees~~ downstream to the coast. There, on island and mainland beaches and tide flats, the cottonwoods feature as denuded and water-worn logs, thrown up by the sea to form tangled obstructions, in some places for miles along the water's edge. ~~There are multitudes of other plants, of course, besides the conspicuous ones first mentioned. Broad-~~

In all four zones there are, of course, 122
~~Here~~ are multitudes of other plants ~~of course~~, besides the conspicuous ones just mentioned. Broad-leaved skunk cabbage borders the meadows, one of the first bits of green to appear in the spring, and often attaining enormous size, with leaves three or four feet long. A carpet ~~of~~ (a very uneven one) of moss, forming soft cushions a foot or more deep, covers much of the forest-floor, and masses of ferns flourish in the wet, shaded depths of the woods. Flowers, and some relatively brilliant ones (such as the red "Indian paint-brush" and the blue lupine), are found in the more open places, but, despite such occasional bits of color, the general effect is somber, the prevailing tone being given by the dark greens of grass and bushes, the dark ~~and~~ vistas of the crowded forest, and the dark depths of the still waters round about. The woods are generally hushed ~~quiet~~ and still, seldom disturbed by song of bird or chirp ~~cry~~ of insect, while the constant drip ~~sound~~ of falling ~~dripping~~ water may hardly be said to break the general quiet.

¶ In this region there are four types of ~~forest and floral~~ vegetational surroundings ~~that~~ may be ~~distinguished~~ recognized as distinct and characteristic, namely, littoral, forest, ~~tundra~~ tundra and mountain-top. Above the dripping, rock-clinging kelp, alternately exposed and covered by salt-water twice a day, are the various ~~marine~~ salt water grasses ~~and~~ or grass-like plants that endure nearly as much submergence. Then, higher in the littoral zone, (I use the term very loosely) clumps of other grasses, willows, alders, elder, and high-bush cranberry, tangles of wild peas, ~~the littoral zone, there are other "grasses" (I use the term very loosely), sometimes waist-high or when waist-high, clumps of willows, alders, elder and high-bush cranberry, tall, broad-leaved wild parsnip, tangles of wild peas, and thickets of salmon-berry.~~ This zone is relatively open and easy to traverse. In fact, one is usually forced into it by the forest-wall crowding alongside.

The intricate channels between the closely studded islands ~~and along the~~ British Columbian coast to the southward, of the Alexander Archipelago wind their tortuous courses for many miles back from the open sea with width and depth varying between wide limits. ~~in every conceivable degree~~. There are impressive water ways that measure from shore to shore, ~~many~~ miles ~~across~~, and others of lesser size down to narrow runs a hundred yards or less in width, ~~across~~ and ~~navigable~~ only to the lightest of ~~boats~~ canoes ~~or motor boats~~. Geologists tell us that these are all "drowned valleys", scoured out by glaciers either before or after submergence below sea level, and indeed at many points the U-shaped cross-section, suggestive of such action, is plainly to be seen, especially from a steamer traveling in mid-channel. In scores of places the channels extend inland as fjiords, extremely narrow and with steep granite walls, with trees clinging most incredibly to the dubious root-holds ~~tree-grown~~ down to high tide level, the below that, down to the water's edge, ~~exposing~~ a breadth of precipitous, polished rock ~~down to the waters' edge~~ on which a fly could hardly find a foothold. There may be miles of such coast line where a moderate sized vessel could tie up as to a

dock, and, with length of rope to allow for changing tides, be safe as to depth of water though within arm's length of shore. In such a fjiord ("canal" is the local term) it is generally useless to seek a landing place until the very head is reached, perhaps 20 or 30 miles inland from the general coast line, and there, where the valley emerges from the sea, is first an ~~vast~~ expanse of grass-grown flats, intersected by a net-work of narrow ditches, and, some ~~reach~~ distance farther back, beyond reach of the highest tides, the forest, stretching inland to unexplored distances.

Any such large fjiord will have a good sized stream, or maybe several, debouching at its head, usually from glacial sources.

Consider that twice in twenty-four hours the changing tides must come up these constructed ~~channels~~ waterways, not only the ten, twenty, or thirty miles of their channels course, but the one hundred or two hundred miles farther from where the open sea lies beyond the island barrier, and an understanding is reached of the reason for the tremendous rise and fall of the tides everywhere along the innermost coast. Twenty or thirty feet

variation ~~is not~~ between high and low tide is not unusual here, where ~~exist~~ a vast volume of water charges ~~is passed~~ inland between increasingly constricting walls. Steamers at any of the ports are tied to the docks by cables that have to be continually re-adjusted, and it is ~~not un-~~ an ordinary ~~usual~~ experience for a shore-going passenger, stepping ~~ashore~~ off, perhaps, on a gang-plank that slopes steeply upward from steamer deck to wharf, to find conditions reversed on his return an hour or so later, and the same gang-plank sloping just as steeply upward from the wharf to the boat's deck.

The sheltered ~~waterways~~ canals and sounds of the Alaskan ~~coast~~ and British Columbian coast are almost entirely protected from the long swell of the open sea, which does, however, make itself felt in a few places, such as Hixon Entrance and Millbank Sound, and as a rule the water's surface is placid and unruffled to a remarkable degree, though it may be disturbed to a point of choppiness by local winds. This surface smoothness is deceiving, however,

and underneath there is often a swiftness and strength to the surging currents that may well spell danger to any ~~traveler~~ unaccustomed seaman, and that, in fact, brings a fairly regular return of accidents, year by year, to even those vessels that ply regularly along the coast.

The tundra zone in southeastern Alaska is ~~limited~~ restricted in ~~extent~~ area and bears ~~little~~ slight resemblance to the limitless tundra of more northern latitudes. It occurs merely as relatively small and isolated ~~patches~~ open areas in the surrounding forest, "parks" in the local parlance. There is a heavy ground covering of mosses and other low-growing plants which hold the moisture, and the entire area is well soaked, often partly submerged. It is noteworthy ~~that~~ the Sodge-pole Pine (Pinus contorta) should be found in this region only in these bogs, and it seems to lead a most precarious existence here, at ~~one of the~~ an extreme outposts of its vast habitat. In the interior at the same latitude (where it is known as "jack-pine") it covers considerable areas, sometimes in pure stands over square miles of territory, but on the coast it is found in stunted form, growing in scattered trees over the wet- ~~muskegs~~ "parks" that characterize some of the islands. It is not easy to understand how these ~~trees~~ pines managed to push westward as they have done, to occupy the scanty tracts suitable to their needs, where, in fact, they seem barely able to survive, but there they are, out clear to the westernmost edge of the Archipelago, ~~as on Hall Island.~~

The Alpine-Arctic zone of the mountain tops includes ~~all of~~ the open, ~~treeless~~ ~~ab~~ unforested areas ~~that~~ that lie above ~~the~~ limit of upright trees, ~~the~~ timber line, which in this region is found at about 2500 feet elevation or less. It is most extensive in area on ~~the~~ three large northern islands, Baranof, Chichagof and Admiralty, and is entirely absent from some of the low-lying southern islands. This area is, of course, cold and rigorous as to climate, snow-covered over much of the year, and ice-covered in many places. The vegetation consists of low-growing grasses, ~~and~~ of heathers, lupines, stone-crop, and ~~and~~ ~~associates~~ other small and hardy shrubs.

East of the separating Coast-Ranges lies the vast interior of northern British Columbia and southern Yukon Territory, as different from the closely adjacent Sitkan district, ~~as~~ it is no exaggeration to say, as Maine is from Florida. In ~~the~~ topography, in climate, in fauna and in flora, the contrasting differences are such as to strike even the most casual observer, it would seem, while to the close student of animal and plant-life it is ~~most~~ fascinating to see the replacement-species of ~~species~~ in the two areas. There is hardly ~~anything that~~ a single ~~species~~ bird of bird or mammal that is ~~not~~ found in both regions; for that matter there are but few species that occur at all in both.

In the region referred to, my observations have extended eastward to Hazelton and Kispiox Valley in the Skeena River drainage, ~~(some 200 miles from the coast)~~, to the Telegraph Creek region on the upper Stikine River, and to Teslin Lake, east of the Atlin region, each of these points being roughly 200 miles from the coast. The Stikine and Skeena rivers drain into the Pacific, and, in common with the other streams of the Pacific drainage, they serve as highways and spawning grounds

for vast hordes of migrating salmon of several species. Only ~~But~~ a short distance east of Telegraph Creek there are small streams flowing eastward that find their way to the Liard River and thence to the Mackenzie and the Arctic Ocean. In the Atlin region most of the ~~streams~~ waters (except the Taku, to the southwest) flows northward into the Yukon drainage, to empty into Bering Sea. Streams forming the local sources ~~Headwaters~~ of these three far-reaching waters interdigitate, sheds, approach each other very closely, to within a few miles. ~~In neither the Yukon nor the Mackenzie systems are there any salmon, though there are plenty of other characteristic fish, notably the Arctic grayling.~~

This is a country of broad valleys, ~~of great height~~ mountains (not nearly so rough and forbidding as the Coastal Barrier), of magnificent lakes and rivers. The Coast Range presents on its eastern face nearly as abrupt a slope as on the coast, though it rises from a higher level (the valley floor at Atlin is about 2200 feet altitude, at Telegraph Creek, 540 feet, and at Hazelton about ~~1000~~ 1000 feet), and lesser spurs and ~~isolated~~ separate scattered smaller ranges extend eastward in diminishing height and area, to the rolling plateau

that stretches still farther east.

The climate of this interior region presents various sharp contrasts to that of the coast. East of the mountains there is abruptly a great falling off in amount of rainfall. This is especially true in the Atlin and Telegraph Creek Carcross, regions, each with an annual precipitation (~~rainfall~~) of some twelve to fifteen inches, compared with one hundred inches or more on the nearby coast. The Skeena River flows to the sea ~~eastward~~ through a broad valley that is bordered by mountains of lesser height than those to the ~~further~~ northward, and coastal fog and rain drifts inland ~~eastward~~ here farther and heavier than is the case on the Stikine and Taku. Inland the summers are ~~bright~~ clear and sunshiny, far warmer than on the coast, and the winters are extremely cold, again in contrast to coastal conditions, where winter weather is not ~~at all~~ severe.

The interior is generally forested, as is the coast, but the inland woods, ~~are delightfully~~ open, sunny and park-like, are a delightful contrast to ~~compared with~~ the gloomy coastal jungles; ~~and~~ the component trees and shrubbery are for the most-part very different. ~~in the two regions. The most~~ The lowland forests of the interior are composed so largely of "poplar" (that is, the quaking aspen; Populus tremuloides) that one may be pardoned a first-impression that there is little else in the makeup of the woods. The bright green of the summer foliage and the brilliant yellows of the autumn are such conspicuous and forceful colors also, ~~that~~ as to fix the attention almost-subconsciously upon the dominant poplars, to the exclusion of the really abundant but less assertive conifers.

The poplar woods are pleasant to be in at any time, but in the fall, after the first frosts have come and while the brilliantly colored leaves are still on the trees, ~~there is one that possesses a~~ peculiarly charming quality developed, and one that is most manifest on gloomy, overcast-days.

the yellow foliage has exactly the tone of brilliant sunlight, and, stepping from the dense shade of spruce timber into a belt of poplars (the transition is usually abrupt), one receives the impression of a sudden clearing away of the clouds overhead, with the resultant burst of sunshine. Time and again under such circumstances I have had to correct an erroneous impression of this sort, a conviction so strong that it was hard for me to be otherwise convinced. Poplar woods in dense stands extend far to the northward of this section. They are characteristic of the lowlands of the Attin region, and, to the southward, of the Telegraph Creek region, and of the Hazelton region, and far beyond. Still farther south the trees climb to higher altitudes, throughout the Rocky Mountains, and ~~south~~ (at altitudes of 8,000 feet and over) even into northern Mexico.

There are other deciduous trees of the interior that are of less general distribution. ~~The~~ Balm of Gilead (Populus balsamifera) is common in the Attin region and most easily picked out from the closely similar poplars in the early fall, for the Balm of Gilead is first-

to change color with the frost, and overnight, perhaps, may spring into yellow prominence. ~~The Birches~~ Birches are ~~are~~ fairly common on the Stikine, sometimes of considerable size, but I saw none around Atlin. ~~The~~ Huge cottonwoods are characteristic of the Stikine bottom lands ~~(perhaps quite) as far up as Telegraph Creek~~ far up the river, there are ~~are~~ ~~latel~~ ~~the~~ rows of them at Glenora, and also of the Skeena River and of the Kispiox. Willows, ~~coarse~~, are everywhere, from dense jungles in the river beds to absurd little fingerling growths on bleak mountain tops, above almost all other vegetation, but at the most they are bushes, rarely attaining a tree-like aspect.

A characteristic timber-line plant is the trailing birch (Betula glandulosa), common almost everywhere ~~above the~~ ~~from the~~ above the limit of upright trees. This covers vast areas, sometimes solid square miles, usually as a prostrate, trailing shrub that is easily walked over, then, in more favorable localities, attaining to upright growths, knee-high, waist-higher, or even higher.

It thus forms what in California would be called "chaparral," in general appearance not unlike the ~~not unlike the manzanita and buckthorn chaparral that clothes the foothills of the~~ scrub-oak covering of the foothills of the Southwestern mountains, but for the most part more easily traversed. This birch grows usually in disconnected patches, so that one can slip through or around, or over if need be, and, by picking and choosing and not being stiff-necked about immediate direction and right-of-way, generally wriggle through without too great difficulty.

In the fall, when the poplars turn yellow, the birch flames into brilliant reds, and, together with fire weed and some smaller shrubs, paints the higher slopes in acres of gaudy colors. ~~slopes in solid bands of color.~~

Of the conifers the conspicuous lowland tree is the white spruce (Picea canadensis), usually forming extensive tracts in almost-pure stands where conditions are favorable. This is a tall, attenuated tree, with numerous short, downward pointing branches, and almost never with any

long branch. With the thickly clothed trunk, the whole tree is exaggeratedly slender, a characteristic feature that can not be mistaken. Sometimes, not commonly, the crown becomes grotesquely enlarged, assuming curiously bulbous outlines, but as a rule the spruce forest thrusts an array of slender spear points upward, unbroken in general aspect for many miles.

In the upper Skeena Valley I saw the black spruce (Picea mariana), in small numbers and always in the same sort of places. The bits of marsh land (muskegs) with which the generally dry forests are studded, are always encircled with a border of black spruce (often together with a few yellow cedar), dark and funereal looking, with long streamers of pendant moss. This tree should occur also in the Stikine and Atlin regions, but I did not see it in the sections I visited. The Engelmann spruce (Picea engelmanni) also reaches the vicinity of Hazelton, in the Skeena Valley, which is supposed to be its northern limit.

long branches. The thickly clothed trunk, exaggeratedly slender, is a characteristic feature that can not be mistaken. Sometimes not commonly, the crown becomes grotesquely enlarged, assuming curiously bulbous outlines, but as a rule the spruce forest points an array of slender spear points upward, unbroken in general aspect for many miles.

On sandy flats the jack pine (Pinus contorta) is found, mostly in rather open groves, and in a charmingly park-like manner of growth. In the spruce woods there is a tangle of underbrush and debris on the ground that often makes travelling difficult, but the pines are delightfully free of obstructions. True, there are places where jack pines grow in such abominably close array as to forbid travel by the very mass of the crowded trunks, and I saw a number of such stands in the upper Skeena Valley, but

on the upper Stikine and about Lake Atlin, the groves were nearly all open and park-like, as described.

The spruces occupy favored sections in the valleys and they cover thickly the lower slopes of the mountains, but a little higher up they give way to the alpine balsam (Abies lasiocarpa). This, the timberline tree of the region, attains as goodly a height as the spruce along the middle altitudes (at from 3000 to 3500 feet in the Atlin country) but on the higher slopes it becomes stunted, and in many places utterly prostrate. upon the ground. Groves of gnarled and twisted balsam, growing in thick masses, with sprawling branches near the ground, their crowns not more than thirty or forty feet high, are to be avoided as being among the most difficult of all woods to traverse. On the rolling plateaus that from so many mountain summits here, the nearly prostrate balsam thickets can be walked over with ease, the thickly matted sprawling branches some two or three feet from the ground, supplying a sturdy support and reasonably secure footing.

The balsam is a tree with delightful personality and with strongly marked characteristics that can

impress even a non-botanical observer. A glimpse of the growing cones is sufficient for identification of the tree, ~~by the outstretched tips~~, for, in contrast to those of all the other conifers of the region, they stand bolt-upright upon the twigs, ~~like so many Christmas candles~~. The cones are unsatisfactory things to keep, for as they dry the scales fall off in utter disintegration, ~~and~~ and the same thing happens upon the tree, where the slender cores of the old cones remain standing, like so many tiny Christmas candles. Then, in early summer the trees produce an amazing quantity of yellow pollen, so that in clambering through the prostrate thickets, as a naturalist is bound to be doing, one emerges covered with a saffron deposit, as though thoroughly dusted with Colman's mustard. A secretion that is less easily disposed of is found in the blisters of semi-liquid resin upon the trunks, which burst when pressed upon and smear their sticky contents upon clothes and hands.

The last conifer of our brief northern list is the juniper (Juniperus communis), which can hardly be termed a tree. It grows in valleys and on

summits, but always the same, a sprawling, discouraged looking shrub, ~~clinging~~ clinging closely to sheltering ledge or boulder, and usually as scattered plants.

The subarctic north is the country of berries, and especially so in the interior. Strawberries in open dry woods and in meadows, raspberries in the rock slides, moss-berries in the damp places, are all delicacies to be accepted gratefully wherever found; ~~and~~ there are plenty of others, such as the high-bush cranberries (whose sweetish odor hangs heavily in the air of the autumn woods), ~~that~~ serve well as preserves, and there are some, like the soapberry, ~~that~~ are only fully appreciated by the Indians and the birds. Many of the berry-bearing shrubs ~~that~~ grow close to the ground have ~~the~~ fair portions of their crops covered by winter snows, to be kept in cold storage until spring-time, ~~and~~ then to be utilized by the arriving birds. In the upper Tanana Valley, hazel bushes bear ~~an~~ abundant crops of nuts, as is reflected in the name of the town of Hazelton.

Attractive as is all of the ~~northern~~ subarctic north, in its varied woods, lakes, and streams, to my notion there is none of it so beautiful, ~~so utterly fascinating~~ so compelling in its ~~attractions~~ features, as the open country above timber line. As one goes northward the ~~climb~~ ascent from valley to summits becomes ~~long~~ increasingly arduous, and in the Hazelton region there is a long, stiff climb through a broad intermediate belt of dark, spruce covered mountainside, hard to traverse and very "dead" as regards animal life, before the timber-line region is attained. At the latitude of Atlin, however, with the valley level at about 2200 feet altitude and timber-line at about 3500 feet, the climb is relatively inconsequential; about an hour's hard work takes one through the forested belt.

On the summits there are frequently many square miles of nearly level ground, rolling plateaus or terraced steps that are approached by gentle slopes. The groves of balsam at the general timberline border ~~and occasional~~ are extended in occasional far-reaching tongues onto the lower summits, or into sheltered

high mountain valleys. There lines of trees, or more often small isolated groves, give an attractive, park-like aspect to the landscape, ~~of appearance~~ heightened by the ~~solid~~ bright banks of flowers that are characteristic of midsummer conditions. Small, shallow lakelets, streams running between mossy banks or between overhanging masses of dwarf willow, melting snow banks, wasting away as the summer advances, all ~~scattered distributed over~~ in open country that can be walked over with ease almost everywhere, form an irresistable combination of attractions. This all refers to elevations (in the Alpine region) below 5000 feet. Above that level the ridges are apt to be gravelly, relatively bare, though with a fairly ~~dense growth~~ thick covering of grass, and with a greater proportionate area of rocky slopes, rock slides, and piled up boulders, larger and more nearly permanent snow banks, and a generally harsher and bleaker aspect.

Life Zones and Faunal Areas

In the study of the distribution of North American birds, mammals and plants, various concepts have been used. Early impressions, as of "eastern", "central", and "western" regions, were gradually abandoned as unsatisfactory; and even thorough and accurate studies of various different areas remained, for a time, uncorrelated by any general principles. Then Dr. C. Hart Merriam (at the time Chief of the Biological Survey of the United States Department of Agriculture) began publication of the series of studies of regions in western North America that so satisfactorily substantiated his his theory of life zones.*

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*See, especially, Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Arizona, By C. Hart Merriam. United States Department of Agriculture, North American Fauna no. 3, 1890; and Results of a Biological Survey of Mount Shasta, California, by C. Hart Merriam. United States Department of Agriculture, North American Fauna no. 16, 1899.

This theory recognizes but two primary life provinces in North America, a northern (Boreal) and a southern (Sonoran), the origin of all forms of life being claimed to have been from one direction or the other. These provinces are subdivided, the Sonoran (its eastern extension termed Austral) into Sower (southern) and Upper (northern); the Boreal, from south to north, into Canadian, Hudsonian and Arctic (the Arctic of the southern mountain tops called Alpine-Arctic); and between Sonoran and Boreal there is inserted the Transition Zone, neutral ground with a mixture of species from both sources. All of these belts, with a general east and west trend, are tremendously affected by altitude, so that in mountainous western North America there is a most complicated interdigitation of the Sonoran zones northward in hot lowlands, of the Boreal zones far southward at various mountain levels, the altitudinal feature being further complicated by slope exposure (south facing slopes being warmer, hence "lower", zonally, north facing slopes colder and higher, zonally) and some other minor factors. The primary divisions are severally occupied by distinct genera,

the lesser divisions by distinctive species. All the divisions are based mainly upon temperature, ~~mainly~~ especially maximum summer temperatures. An enormous literature of the subject has grown up, and there are masses of published data available for many sections of the country that enable any one to test for himself the application of the theory.

Later on another concept, of "faunal areas", was employed, based largely upon relative humidity, and, in North America, most satisfactorily exhibited in the west, with its varied topography. A faunal area, perhaps ~~several~~ less than one hundred miles square, ~~will often~~ may comprise several life zones, and a life zone in its various extensions across the continent will traverse a number of faunal areas.*

* See Grinnell, J.

In the northwestern section of which we treat, the region west of the Coast-Range in southeastern Alaska, the Sitkan district, is a well defined faunal area, too far north for Sonoran, Transition, and Canadian zones, and at different elevations comprising the Hudsonian Zone at the lower levels, Alpine-Arctic on the summits. East of the Coast-Range is the Cassiar district, another faunal area, Hudsonian zone over most of the lowlands, and Alpine-Arctic ~~on the mountain tops~~ above timber line.

of the Hudsonian zone over most of the lowlands, and Alpine-Arctic on the mountain tops, above timber line.

Apparently the Cassiar district should be limited southward along an east and west line about one hundred miles north of the Skeena River at Hazelton. There is a rise of land thereabout that marks the northern limits of a number of bird and mammal species, as well as reptiles (only one species, a snake, Thamnophis, extends that far north), and there are many northern birds and mammals that have their southern boundary about at the same line. With the southern delimitation of the Cassiar district tentatively thus placed, there remains the further definition of the faunal area that lies south of that line. For this we lack sufficient data, other than that the Coast Range will still serve at the west.

~~at the west.~~
~~will still serve for the western boundary.~~ There are many birds and some mammals that reach no farther north than this region, and ~~many~~ of the truly arctic species none reach this far southward in the lowlands and ~~but~~ only a few on the mountain tops.

~~In~~, Altogether, piecing together our available ~~info~~ facts regarding the occurrence of birds, mammals, reptiles, and plants in northern British Columbia and southeastern Alaska, we can reach the following conclusions. That the Sitkan district can be recognized ~~defined~~ as a well-defined faunal area, ~~lying~~ ~~between extending~~ with Seymour Canal and Glacier Bay at the northern extremity, Dixon Entrance at the south, and including all the islands between those extremes, as well as the extremely narrow ribbon of the adjacent ~~intervening stretch of~~ mainland coast, ~~eastward from the Cho~~, westward from the summit of the Coast Range. The Cassiar district can be partly outlined, its western boundary the Coast Range, its northern ~~boundary~~ limit ~~is~~ arbitrarily placed for the present along the Yukon-British Columbia boundary line, its southern boundary at the rise of land, about one hundred

miles north of the Skeena River at Hazelton, its easternmost extension for the present undetermined. South of the Cassiar district, on east of the Coast Range, the existence of another faunal area (distinguishable) is suggested, which may be called the Omineca district (after the mining district, so-named, of the same general region). The southern and eastern boundaries of this faunal area are still to be determined.

~~Orthis m~~

~~On the northwest coast of North America~~ The narrow strip of territory lying west of the Coast-Ranges and the Cascades possesses strongly marked characteristics of fauna and flora that stamp this whole coastal area from Alaska south into California, in some respects even ~~in the case of some species~~ almost as far as southern California. The Sitkan district is almost the northern extremity of this peculiar coastal strip. Of the birds of the Sitkan district, with which we are here mainly concerned, with but few exceptions they are the same as, or most closely related to, species farther south along the coast, and for the most part far more remotely related to those of the closely adjacent interior. Characteristic coastal birds that at once come to mind are the Sooty Grouse, Hudsonian Horned Owl, Red-breasted Sapsucker, Red-shafted Flicker, Western Flycatcher, Steller Jay, Beach Crow, Oregon Junco, Rusty Song Sparrow, Intescent Warbler, Chestnut-backed Chickadee, and Russet-backed Thrush. On the northern islands and on the Alpine Arctic heights there are some ~~north~~ Boreal species, such as Ptarmigan and Rosy Finches, but these are not many, and there are many more ~~a number of~~ Boreal birds that extend to at least as

far southern latitudes in the interior and that eschew the coast altogether.

The seasonal migration of species to and from this region is not the noticeable feature that bird migration is in most parts of North America. There are a few kinds that do have well defined and fairly extensive migrations, such as the several species of swallows, Western Flycatcher, Sulfescent Warbler and Russet-backed Thrush, which withdraw in winter as far as Mexico and perhaps Central America, but there are exceptions. Mallards and ~~geese~~ White-cheeked Geese remain through the winter, as well as some other ducks and many sea birds. Some small birds that do migrate travel but a short distance southward, perhaps to the coast of southern British Columbia, or, less commonly, ~~rarely~~ into California. Some Song Sparrows, Chickadees, Steller Jays, and occasional even Townsend's Fox Sparrows, Robins, and Varied Thrushes, find favored sections of the Sitkan district where they stay throughout the winter months.

It seems appropriate to speak here of a few certain mammal species of the Sitkan district, as offering distributional facts comparable to what is seen in the birds. The three large northernmost islands, Baranof, Chichagof and Admiralty, differ from the southern ones in several respects, notably in the occurrence there of species of the large northern Brown Bear, to the exclusion of the Black Bear, which occupies all of the southern islands. The characteristic ungulate of the Sitkan district is the Black-tailed Deer, common on all the islands, rare on the mainland; inland, the Moose occupies a corresponding position. Caribou, Mountain Sheep, Fox, Lynx, and Rabbit are characteristic northern mammals that are common inland, almost unknown to the coastal district. This statement must be modified to this extent, that a dwarfed form of Caribou has been found upon one of the Queen Charlotte Islands (south of the Sitkan district). This was a most unlooked-for occurrence, and the animals were apparently few in numbers, and of dwarfed stature, and the species may even now be extinct. The common meadow-mouse of the southern and central islands of the Sitkan district is Microtus macrurus, which ranges south at least as far as Puget-Sound. The most

Common inland species is Microtus pennsylvanicus drummondi, the western representative of a species that extends eastward across the continent. drummondi occurs commonly from the interior along the Taku River clear to salt-water, the only place where it is known to reach the coast. And on Admiralty Island, directly across the channel from the mouth of the Taku, (and on that island alone), there is a meadow mouse that is barely (dubiously, perhaps) to be distinguished from drummondi. It is a suggestive occurrence: Then, coastwise and inland, there are in the two regions related, but distinct, species or subspecies of Red Squirrel, Weasel, Marten, White-footed Mouse, Red-backed Mouse, and others, the conditions (allowing for our less exact knowledge of the small mammals) being about as with the birds. ~~Beneath~~ Among the mammals, just as among birds, there are in the Sitkan district more species along the mainland coast and on the innermost islands, and a ~~an increasing regular~~ progressive diminution in number of species westward to the outermost edge of the archipelago.

There are some notable peculiarities in the distribution of birds and mammals among the islands of the Sitkan district. We are accustomed in western North America to find the intangible barriers formed by differing degrees

of temperature and humidity acting with potency and exactness, but in this region such factors are practically uniform throughout. There are, however, the mechanical barriers formed by the channels between the islands, barriers whose effectiveness we might be expected to gauge pretty accurately in relation to their depth, width, and the character of the species involved. As a matter of fact, we find in many cases a disconcerting lack of conformity between the range of a species and the factors above listed that might be expected to control its distribution. Certain species of grouse and of mice may be considered together in this connection.

Coronation and Warren are two small outlying islands at the western edge of the Alexander Archipelago. Coronation lies about six miles south of the large Kuiu Island, Warren about two miles west of Kosciusko (which is barely separated from Prince of Wales Island). Coronation and Warren are about eight miles apart. They have one species of meadow mouse (Microtus coronarius) common to the two, and as far as known occurring nowhere else; and a White-footed mouse (Peromyscus sitkensis) found on both which is not found on either of the large islands closest to them. Now, the Sooty Grouse (Dendragapus), resident on Kuiu,

is found on Coronation, but not on Warren. The Spruce Grouse (Canachites), resident on Prince of Wales, is found on Warren but not on Coronation. It is hard to imagine what the nature of the factors may be that have permitted small and feeble terrestrial mammals (mice) to establish themselves upon the two islands, eight miles apart, but have prohibited their further dispersal over the lesser channels that separate from the larger islands beyond; and at the same time have barred strong flying species of grouse which have already crossed the narrower channels. It may be said, further, though, that elsewhere in the Alexander Archipelago both species of grouse are delimited in their distribution by channels four miles or less across, while both must at some time have passed over far wider channels in order to have crossed from the mainland to the islands where they now are. Nowhere are both species known to be upon the same island ^ They have with little doubt been established upon the islands for vast periods of time, but it is hardly conceivable that this territory was free of ice and habitable for animal life until long after the separation of islands from mainland. ~~Everything goes to show the gradual extension of bird and mammal species westward from the mainland to islands already formed.~~

There is much evidence tending to show the gradual extension of bird and mammal species westward from the mainland to islands that were already ~~former~~ in existence as such. Of both birds and mammals, ~~the several~~ the existence of species on the adjacent mainland ~~and~~ that are on none of the islands, the greater number of species ~~(both birds and mammals~~ on the islands near the coast, and the steady lessening in ~~species~~ birds and individuals westward; also the known distribution of certain ~~species~~ forms over groups of islands obviously reached with ease, one from another; all these are facts supporting the theory mentioned. At the same time there are more than a few curious, apparently anomalous, occurrences and non-occurrences upon certain islands that are puzzling in the extreme.

Of the avifauna of the Cassiar district, in strong contrast with that of the coast, all affinities are with ~~the birds of Arctic and~~ toward boreal and eastern North America. Here is a strong representation of northern species, many of them resident, and of eastern birds, ~~which all~~ most of which perform prodigiously long migrations. Of the former there are, such species as Ptarmigan, Gyrfalcon, Hawk Owl, Canada Jay, Rusty Blackbird, White-winged Crossbill, Redpoll, Bohemian Waxwing, Northern Shrike, and Hudsonian Chickadee. Of eastern birds, some characteristic species are Yellow-shafted Flicker, Eastern Nighthawk, Eastern Purple Finch, Tennessee Warbler, Eastern Yellow Warbler, Myrtle Warbler, Black-poll Warbler, Redstart, ~~Eastern~~ Olive-backed Thrush and Eastern Robin. There is, besides, an infusion of Rocky Mountain and Great-Basin species, such as Say's Phoebe, Bendire's Crossbill, Townsend Solitaire, and Mountain Bluebird.

In the Ominica district we are south of the line where truly Boreal species may be found nesting in the lowlands, and such birds as Hudsonian Chickadee, Canada Jay, and White-winged Crossbill must be sought on the higher mountain slopes, to which the Hudsonian zone is restricted. Here, in the valley, we find a number of birds at their extreme northern limits, some of them again being Eastern species, such as ~~others from the Rocky mountain region the eastern birds~~, the Eastern Kingbird, White-throated Sparrow, Red-eyed Vireo, Magnolia Warbler, and Catbird. The Audubon Warbler is common here, just south of the southern limit of the closely related Myrtle Warbler, and here, too, is approximately the northern bounds of Pileated Woodpecker, Western Crow, Evening Grosbeak, Cedar Waxwing, and Western House Wren.

(Begin new page)

The Coast Range in southeastern Alaska forms a barrier between coastal region and interior of an abruptness and effectiveness that can hardly be duplicated elsewhere ~~in North America~~ among north American mountain chains. It rises steeply from salt-water in a series of serrated ridges and towering peaks that culminate in summits ~~that are~~ 8000 feet high and more. The highest elevations appear to be ~~mostly~~ jagged and exposed masses of ~~exposed~~ granite, below which glaciers and snow fields cover most of the middle heights and fill many ~~much~~ of the lower cañons and valleys. ~~Forest almost~~ Unbroken forest clothes the lowest slopes. It has been said ~~that~~ no ~~any~~ mountain chain, however rugged and steep, is in itself a ~~any~~ barrier to animal distribution, since any

mouse (that is, the species) would be able ~~eventually~~ eventually to cross, but that the climatic changes, of temperature especially, that accompany rising really altitudes are what ~~truly~~ constitute the obstacle. This is, of course, true enough, even if the case here in final analysis, considered, but it would seem that towering granite cliffs, and many miles of glacial ice, would in themselves discourage passage of animal life, even of kinds that could otherwise endure conditions.

readily
In traversing this barrier, as we ~~easily~~ may, ~~may readily be done~~, over the summit at White Pass, or piercing the center along the courses of the Stikine and Skeena rivers, it is easily possible to recognize the obstructing conditions that exist throughout this belt. In ascending the White Pass, ~~one passes from the coast~~ from coastal forest conditions at the sea level of Skagway (not quite typical of the coast region generally, perhaps, but sufficiently

so), one arrives ~~and~~ rather abruptly at the ~~to~~ timber-line surrounding of the summits at "the Boundary." The long stretch of tundra-like country ~~that~~ is then traversed, all at high altitudes, is obviously unsuited to the forest dwellers at the coast, both birds and mammals, most of which never very nearly approach the upper timber limit. In descending the eastern slopes of the White Pass a somewhat more gradual entry is made into the forested lowlands, the dwellers of which are as rigorously confined to their side of the mountains.

The Stikine River rises far in the interior, flows westward through the Coast-Range and reaches salt-water near the town of Wrangell. In it passage through the mountains, a distance, roughly, of about one hundred miles, the river valley is much constricted, hemmed in between steep mountain sides, sometimes the river itself confined ~~between~~ in narrow

gorges between perpendicular walls of rock.
Quotations may ~~could~~ be taken from a writer (Emmons)
upon the Tahltan Indians, who thus describes this
section of their country: "The lower valley of the Stikine
from just below Glenora to the coast, a direct distance
of about eighty miles, is included within the coastal
range and constitutes a region of great humidity,
with leaden skies and an annual precipitation
equalling if not exceeding that of the coast which
reaches a mean of eighty-six inches. The snow
thereabouts is excessive, and accounts for the extensive
glaciers that fill the valleys; and long after spring
has opened in the colder interior the lower river
flats are covered with their burden of snow and
ice..... Forests of spruce, fir, cedar and
hemlock cover the mountain slopes to the limit of
tree growth, while in the river valleys cottonwoods
grow to considerable size, and groves of alder
and willows, with the devil's club and berry

bushes, form an almost-impenetrable barrier.....
It may be pertinent to remark here, that this region which may be characterized as the wet-belt has never been inhabited by either Tahltān or Tlingit in the sense that they have permanently occupied it and it is scarcely more popular as a* hunting ground owing to its poverty and inaccessibility.

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* Emmons, G. T. The Tahltān Indians. University of Pennsylvania, The Museum, Anthropological Publications, vol. 4, no. 1, 1911.

Thus the valley of the Stikine, which might be regarded as a potential highway ~~from~~ between coast and interior, actually does not act as such, so far as animal and plant-life is concerned, or at most to a negligible extent. The ~~u~~niformity and extraordinary density of the all-prevailing forest-would

debar the presence of all but a few animal species in any event, and the persistence of winter conditions long after spring has opened upon either side of the mountains is a climatic ~~condition~~ barrier that is doubtless of strong potency. There are most abrupt changes in fauna and flora on the two sides of the Coast-Range where the Stikine pierces the range, and ~~but the~~ only a slight overlapping of species along this river valley.

The Skeena River, like the Stikine, ~~has~~ has its sources far inland ~~&~~ and reaches the coast through an opening between the mountains. The Coast-Range at that point, however, is not so ~~rough~~ lofty and rugged as it is farther north, and the Skeena flows through a broader valley than does the Stikine. ~~Heat~~ Coastal rain and fog drifts inland

here to a much greater extent, and there is also along the upper Skeena (the northern Hazelton district) an intermingling of coastal and inland birds, and of some forest-growths, such as ~~the~~ can not be found in the Cassiar district. This is exemplified in the characters of certain bird species, such as the ~~Crested~~ Steller Jays (Cyanocitta stelleri), the Juncos (Junco oreganus) and ~~the~~ most conspicuously in the Flickers (Colaptes auratus and C. cafer). Here, too,

Thus, observation of conditions along various lines between the coast and the interior, as ~~the~~ the White Pass, Stikine Valley and Skeena Valley, yield many significant facts bearing upon the distribution of species in the two regions. Certain supplementary observations that are available, from field work at the heads of certain far-reaching

the Thlingit Indians of the coast have penetrated far inland, and there are old established villages with rows of ancient totem poles in the valleys of the Skeena and its tributary the Kispiox, one hundred miles from the coast.

Thus, observation of conditions along various lines between the coast and the interior, as the White Pass, Stikine Valley and Skeena Valley, yield many significant facts bearing upon the distribution of species in the two regions. Certain supplementary observations that are available, from field work at the heads of certain far-reaching inlets and at the mouths of lesser streams that also rise east of the mountains, all support the same general conclusions.

Any speculations on the origin of the avifauna that now occupies the Sitkan district would seem to be safely based on an assumption of the relatively recent occupancy of the territory by ~~to~~ animal and plant-life of any sort. Conformation of the earth's surface, the vast areas that are ice-covered at the present time, and the fact that these ice fields are visibly retreating today, all point to the likelihood of this region having been ice-bound in its entirely at a not remote period, ~~not so very remote~~, speaking in terms of geologic time, perhaps not so very remote even in terms of years.

With the bird population in mind, it ~~It~~ seems likely that the country east of the mountain became clear of ice and habitable long before the coastal district, to be occupied at once by ~~the increasing~~ the species to the southward and eastward. The Coast-Range stood as an impassible barrier to this immigration, ~~as it is today~~, marking the bounds of a long array of species, as it does today, even after the coastal region eventually became habitable in part to the quite different array of species that flowed ~~poured~~ in from the

country directly to the southward. The presence of this population would, presumably, ~~of course~~, exert against the eastern species pressure of another sort, to be less of an effectiveness is to be tested after the eventual nullification ~~melting away (almost literally)~~ of the mechanical barrier of the ice found in the ice-clad mountains. There can be seen today in places the beginnings of this passive struggle between unlike species with similar needs, and between closely related species now meeting after traveling widely separated avenues of approach.

At least that is the way it looks to me. There is no appeal to me in ~~not accept~~ the alternative view that the whole region, east and west of the Coast-Range, might have been originally occupied by an ancestral population that was all alike, to be variously modified subsequently ~~modified later in more recent~~ ~~times~~ by the varied conditions of the several sections.

¶ Truly arctic birds, which form but a small proportion of the avifauna of the Sitkan district, were probably

the ~~last~~ latest arrivals there, for ~~there~~ the timberline habitat to which most of them are restricted, would be about the last part of the country to become ~~to~~ available for occupancy.

The Sitkan district is poor ~~indeed~~ in the number of land bird species that comprises its avifauna, ~~for~~ and the over far the greater part of the region there is also a notable paucity of individuals. At certain favored places, and at some periods, birds can indeed be found in numbers, but there are hundreds of square miles of unvaried spruce forest, dark and cheerless, and almost birdless. ~~On~~ Some of the westernmost islands in particular one can easily yield to an impression that everything is so new and unfinished ~~and~~ that the birds have not yet found the place. ~~Species~~ Number of species and number of individuals lessens steadily from the mainland coast westward. A reason for the relatively few species on ~~the~~ most of the outer islands lies in the uniformity of environment, and of an

environment that is not adapted to a variety of bird life.

Unbroken coniferous forest, densely massed, prevails over three-fourths of the area, this bordered along the beaches by a narrow belt of alders and surmounted by a greater or less expanse of Alpine-Arctic summits. Small acreages of salt-grass meadow on the tidal flats, of muskegs or parks on the hill-sides, of densely brush-covered stream-sides and lake shores, and of alder-grown slides on the steeper slopes, comprise about as much variety as can be found.

Along the mainland shore there are the mouths of several large rivers that pierce the Coast-Range, and in these broad valleys there is to be found a greater variety of surroundings, and an environment, too, that is much more favorable to a long list of bird species. These river valleys also form avenues of approach from the country beyond the mountains, and exploration at the mouths of such streams has disclosed the presence in small numbers of inland bird species not occurring elsewhere in the Sitkan

district. Collecting by the writer one summer ~~years ago~~ along the lower reaches of the Clickamin River, some seventy-five miles north of Dixon Entrance, yielded specimens of, Violet-green Swallow, Cedar Waxwing, Louisiana Tanager, and Alder Flycatcher, all inland species that had not then been found elsewhere upon the Alaskan coast, ~~, as well as Olive-sided Flycatcher~~ but which were certainly breeding at that point. There, and at such similarly situated places as the mouths of the Stikine and Taku rivers, and at the heads of some of the deeper inlets, other inland birds occur in limited numbers, such as Olive-sided Flycatcher, Western Wood Pewee, and Western Yellowthroat, and Tolmie Warbler.

These advancing scouts may fairly be considered as the worthy descendants of hardy ancestors who ages ago extended the domain of their kind as rapidly as the retreating ice left territory open for occupancy. They are entering a region now where some will find limited areas suitable to their needs unoccupied by any bird species; some may find a cousin with like tastes already on the ground to dispute a later arrival.

Franklin's Grouse is an inland species that has succeeded in entrenching itself on several of the coastal islands, so recently that little or no change ~~is~~ in appearance of the bird is yet apparent. ~~Its cousins, its northern cousin, the Valdez Spruce Grouse,~~ His northern cousin, the Valdez Spruce Grouse, has also reached one or two coastal points, and has developed a barely perceptible change in color from the parent stock of the interior. The Alaska Three-toed Woodpecker and the Rocky Mountain Downy Woodpecker have both reached the Sitkan district in ~~small~~ scanty numbers, the former established as a resident, the latter known only as a migrant, neither of them perceptibly altered in color or markings. The Hairy Woodpecker of the Sitkan district reached that region from the interior, a slightly modified variant of the Rocky Mountain Hairy Woodpecker, and is firmly established there, of general distribution and of fair abundance, as birds go in that country. This ~~is not~~ subspecies is not particularly closely related to the dark colored Harris Woodpecker of the southern British Columbian coast, with which it was formerly considered to be identical. That form

has developed a still darker variety upon the Queen Charlotte Islands, these northern limit of this dusky strain.

Hybrid flickers that have been found on the coast and inland give evidence of the meeting of the Yellow-shafted and Red-shafted species, with ~~such results as have been~~ the same results here as elsewhere under similar conditions

The big rivers above mentioned form migration paths, or rather, fly-paths, to a limited extent, and used mostly by inexperienced young birds on their first southward flight. Magpies appear pretty regularly on the coast in the fall, and Mountain Bluebirds, Say's Phoebes, Sparrow Hawks, and even an occasional Northern Shrike and Rusty Blackbird drift down stream to salt water at the summer's close.

The Myrtle Warbler is a regular and fairly common migrant on the mainland coast. Presumably a slight modification of existing conditions might enable it to extend to the Sitkan forests the boundaries of its nearby summer home. It breeds now within eighty or ninety miles of the coast, and there

is no obviously competing species in that region.

In contrast to the many eagerly advancing pioneers from the east, pressing coastward wherever a possible opening appears, most of the components of the ~~the typical~~ coastal avifauna ~~is~~ conservatively clings to ~~this~~ harsh and exacting surroundings. A ~~large~~ fair proportion of the coastal birds are largely or entirely resident there, and any range extension eastward would entail wintering under widely different (more severely cold) ~~(more severe)~~ conditions than in their present home. So, with ~~one or two~~ a few exceptions, the Sitkan birds remain pretty constantly on their own side of the mountains. One of the exceptions is the Rusty Song Sparrow, a local variety of a wide-spread ~~and even~~ species, a species that, ~~curiously~~ most exacting in its requirement of fluviatile or littoral surroundings, is at the same time tolerant of an extreme variety of climatic conditions. ~~In the northern~~ From central British Columbia northward we can see the gradually increasing unfitness of the inland climate to this

bird, for, extending across the province in its southern half, northward the song sparrow area becomes gradually until it becomes a
pinched, ~~to the~~ narrow ribbon along the coast. The
Song
Rusty Sparrow is abundant up the Skeena River at
least to the Hazelton region, it is rare up the Stikine as
far as Telegraph Creek, and, the next step to the northward
~~a single bird that) once saw on the west side of an occasional straggle~~
a single bird that) once saw at the southwestern
corner of Tagish Lake (just east of the Coast Range, in
the Atlin region) was probably ~~one of~~ a straggler
such as reaches that point from time to time.
Rusty
So the Song Sparrow is feeling its way inland into a region
its
still unoccupied by ~~its~~ kind, though to our eyes
the country
~~it~~ does not ~~bioutly~~ seem unfitted for summer residence of
the species.

The Red-breasted Sapsucker is another bird that extends far eastward in southern British Columbia, but is confined to the coast in the north. Like the Song Sparrow, and to about the same degree, it presses

far inland up the Skeena Valley, in much lesser force up the Stikine.

The northwest coast humid belt is commonly spoken of as being inhabited by dark colored forms of birds and mammals, the rich browns distinctive of certain characteristic species, of the region being taken to be representative of the mode. This is true to a certain extent, but it ~~is required~~ is a statement that requires considerable modification. For one thing, as regards birds, the darkest-colored varieties occur mostly south of the Sitkan district, ~~on~~ the Queen Charlotte Islands and in the Vancouver Island and Puget Sound regions. This is ~~strongly~~ apparent in such variable forms as the Steller Jay, Hairy and Downy Woodpeckers, Song Sparrow and Fox Sparrow. Besides the large proportion of resident land birds in the Sitkan district there is a fair number of summer visitants, and there are mostly species that breed all along the coast, south to California, and that spend the winter still farther south. Of these species the Sitkan contingent is for the most part not changed one whit from the mode of their

kind, and Alaskan specimens of, for example,
species, and ~~the~~ ~~Red-tailed Hawks~~, Western Flycatcher,
Lutescent Warbler, ~~Townsend's Warbler~~, and Russet-backed
Thrush (all rigidly confined to the coast in the north),
are not to be distinguished from the same species
~~their kind~~ in California.

There are others ~~species~~ that are more wide-spread in
their general range, such as Barn Swallow, Tree
Swallow, Belted Kingfisher, and Water Ouzel, all fairly
common in parts of the Sitkan district, that again have
not developed any peculiarities of color in that part of
their habitat.

It is among the resident or nearly resident species, those
that at the most migrate but a short distance up
and down the coast, always within the same general type of environment,
~~that are stamped with the~~ that we find the
rich, "saturated" coloration that we have grown
accustomed to associate with the humid coast-region.

In this category there are the ~~Northwest Coast~~ Great Blue Heron,
locally named races of Great-Blue Heron, Horned Owl,
Red-shafted Flicker, ~~Hairy~~ Steller Jay, ~~Sooty and Rusty~~ Song
Sparrow, Fox Sparrow, Ruby-crowned Kinglet, and
Hermit Thrush, to name some of the ~~most~~ more conspicuous
and better known examples.

Among the water birds the Canada Goose is the one outstanding species that has developed a strongly characterized local race on the northwest-coast. This subspecies, the dark-colored ~~White~~-cheeked Goose, is closely confined to the coastal region, is ~~conspicuously~~ almost exclusively littoral in its choice of environment, and is very slightly migratory. The bulk of the population remains in parts of the Sitkan district throughout the winter. In this connection comparison with the Mallard at once comes to mind. The Mallard in this region has much the same habits, mode of life, and choice of environment as the White-cheeked Goose, and it is, similarly, resident in the Sitkan district the year through. While it has not been proved, it seems likely that, the species is resident in the sense that it is the same population that does remain there, not a moving out of summer visitants, replaced by winter visitants of the same species from other points. At any rate, the Mallard in the Sitkan district exhibits no perceptible peculiarities of appearance. The Canada Goose, however, is of a "plastic" and impressionable nature, in that it has developed several

strongly characterized subspecies in different parts of its wide habitat across North America, while the Mallard, at home throughout the Northern Hemisphere, is notably resistant to local influences and remains unchanged over nearly all its range.

Any study of the birds of the Sitkan region should take into consideration the relation of this section to the Alaska Peninsula and the Aleutian Islands, which lie far to the westward and in part south of the latitude of the Sitkan district. There are various bird species known to inhabit those western portions of Alaska, that have been inferentially ascribed to the Sitkan district, too. Peale's falcon, for example, because it nests also on the Queen Charlotte Islands, south of the Sitkan district, and ~~several~~ several species of auklets because they appear in winter along the Washington coast, still farther south. Actually, the Sitkan district is not on a direct line between the Queen Charlottes and the Aleutians, nor between the coast of Washington and the Aleutians.

Certain observations tend to show that ~~there~~ there is a line of migration from the ~~Aleutians~~ Alaska Peninsula to the southeast, ~~passing by the~~ almost entirely passing by the Sitkan district ~~and~~ as well as much of the coast of British Columbia. The Aleutian Savannah Sparrow (Passerculus sandwichensis sandwichensis) is a case in point. This bird breeds on Unalaska and on the Aleutian Peninsula, and in migration it occurs sparingly ~~along~~ on the western islands of the Alexander Archipelago. It is extremely rare on the inner islands, and it is, I believe, unknown along the Alaskan coast immediately north and west of the Sitkan district. ~~Obviously~~ Apparently the main migration route must lie from the Alaska Peninsula across the Gulf of Alaska, a little south of east, to the Queen Charlotte Islands and the coast of southern British Columbia.

Returning once more to consideration of the quite different faunas and floras on either side of the Coast-Range, some striking ~~analogies~~ analogies ~~are~~ occur in the human inhabitants of the region. ~~The Tlingits~~ The Tlingit Indians of the coast, and the Tahl-tan and related tribes of the interior, are, respectively, of different linguistic stock, they have very different cultures, and ~~they for the most part~~ as a rule, under primitive conditions, they left apart, in fact were often actively hostile to one another. The Tlingits were far the more aggressive, and for the most part the interior tribes were decidedly fearful of their belligerent western neighbors. In view of this general attitude it is surprising to learn that at some ~~rather~~ period, of a tradition rather remote historically, a Tahl-tan family moved down the Stikine and into the territory of the Tlingits, establishing residence ~~there~~ on ~~or of the inlands~~. ~~the~~ at ~~several~~ points. The descendants of this group ~~have~~ remained there, on friendly terms with the surrounding Tlingits,

and returning on periodical visits to their ancestral home east of the mountains. There is close resemblance here to the behavior of certain bird species of the interior ~~that~~ have established small outposts on the coast. Then again, Thingit tribes have pressed far inland up the Sheena River, two ~~(just as certain coastal bird species have done)~~, hundred miles or more*, residing in close juxtaposition to interior ~~tribes~~ Indians of Athapascan stock, a general situation exactly such as we see in the birds of the same section. A Thingit tribe, too, claimed certain rights of fishing and berry-picking on the upper reaches of the Stikine, ascending the river on summer visits just about as far as does the Rusty Song Sparrow of the coast! ~~The~~ Here are interactions of apparent-analogies, ~~between~~ birds and men need not be pushed too far, but the circumstances are worth a passing comment.

As regards the avifauna of the northwestern interior, of the Cassiar and Omineca districts, it is distinctly similar to that of eastern North America. Of northern species in its composition, of course, and in some cases with modified representatives (subspecies) ~~of the eastern species as local representatives~~, as local exponents of the species, but still, on the whole, with little that is suggestive of the United States ~~region~~ west of the Rockies, and almost nothing suggestive of the extreme western Pacific slope. The great stream of migrating birds that traverses the length of the Mississippi Valley washes against the eastern face of the Rocky Mountains, and that range trending more and more to the westward at its northern end, and at the same time becoming of less formidable continuity as a barrier, the more northern migrants press westward through passes over the lesser heights and occupy the lowlands beyond, clear to the Coast Range. The general tone of the summer bird

population is given by such conspicuous and typical eastern forms as the Yellow-shafted Flicker, Eastern Nighthawk, Black-poll Warbler, Eastern Purple Finch, Redstart, and Olive-backed Thrush, all of which reach extreme northern British Columbia, ~~most~~ most of them considerably farther north. In the Skeena Valley, of the Omineca district, all of the above occur, and there are also many other eastern birds, here at their northwestern limit, such as Eastern Kingbird, Red-eyed Vireo, Magnolia Warbler, and Catbird.

Throughout both the Omineca and the Cassiar district there is a lesser representation of birds that occur in the United States from the Rocky Mountains westward. For the most part it has not yet been possible to recognize in the northern summer visitants any peculiarities that would definitely attach them to any particular southern region, but my conviction is that in most cases the individuals that summer in the north are related to the Rocky Mountain and Great-Basin section of the species' range, rather than to the contingent of the Pacific slope. ~~Birds~~ This group includes Swainson's Hawk, Say's Phoebe, Hammond's and Wright's flycatchers, Western Wood Pewee,

Western Savannah Sparrow, Louisiana Tanager, Audubon's Warbler, and Rocky Mountain Bluebird.

Of Pacific coast birds that spend the summer in the northern interior there are Gambel's Sparrow and Golden-crowned Sparrow. The latter is ~~I believe~~, the only species I know of that breeds inland in the north and winters in the relatively restricted Pacific slope region to the southward, the winter home of so many birds of the Sitkan district. The Golden-crowned Sparrow nests ~~on the mountains~~ at high altitudes in the Cassiar district, and it is just possible that it does so in some parts of the Sitkan district as well, perhaps along the mainland coast. The mountain summits of the coast have not been thoroughly explored, and the Golden-crowned Sparrow is known to reach the coast of Alaska farther to the north and west.

There are certain absentees from the Attin ~~and~~ ~~Telegraph Creek~~ region that might be expected to be there, and their absence from this particular section supplies subject matter for speculation. This list includes Rosy Finch, Fox Sparrow, Pine Grosbeak, and Varied Thrush; ~~of~~ Each of ~~these~~ which species there ~~are~~ is a more northern, eastern, or southern subspecies, on the one hand, a more western subspecies on the other. ~~And~~ It is a striking fact that ~~although~~ instead of a connecting population of "intermediates", typical of neither one form or the other, such as might have been looked for in the region, the several species are not represented there at all. It may be noted, too, that there are certain northern subspecies, ~~such as~~ of the Hairy Woodpecker and Downy Woodpecker, for example, that occur in typical form but in very ~~few~~ small numbers, as far south as Attin, while a short distance farther south ~~their respective~~ southern subspecies of these species, again in nearly typical form, suddenly occur in some abundance.

We thus find in this northwestern country that there are certain slightly differentiated subspecies whose respective habitats are separated (in part, at least) by an hiatus in which neither form of the species occurs, and that there are others ~~(in the breeding area)~~ such closely related races which occur ~~as typical form~~ each ~~through~~ in small numbers ~~but~~ but in typical form almost or quite to a meeting point. In neither case is there the "intergrading" at these particular points of junction that we regard as one test of a subspecies. The observed conditions would seem to be a result of the manner in which the country was populated by the several subspecies. It suggests a filling up of available territory by forms ~~which, then~~ with characters already fixed at the time of immigration.

~~Water~~ Sea Birds

("Divers", Gulls, Terns, Petrels)

Coast	Interior Inland
	Colymbus holboelli
	Colymbus auritus
Gavia immer	Gavia immer
Gavia stellata	
Sunda cirrhata	
Fratercula corniculata	
Cerorhinca monocerata	
Ptychoramphus aleuticus	
Synthliboramphus antiquus	
Brachyramphus marmoratus	
Cepphus columba	
Uria troille californica	
Larus glaucescens	Larus a. argentatus
	Larus brachyrhynchus
	Larus philadelphia
Sterna paradisaea	Sterna paradisaea
Oceanodroma furcata	
Oceanodroma l. beali	
Phalacrocorax p. robustus	

In the nearly absolute restriction of sea birds to the sea and their absence from fresh water, there is no question of life zones or faunal areas as explanatory of their distribution. True, ocean birds are confined within habitats that are circumscribed by as intangible barriers as those of life zones, but that is a phase of the matter with which we are not here concerned. It is to all appearance the love for salt-water or else the dependance upon some condition in, or production of, salt water, that keeps sea birds in the sea and away from closely adjacent bodies of fresh water. I do not know whether murrelets, auklets, and their ilk would soon pine away and die if kept captive in fresh water, as some of the antarctic penguins have been known to do, but normally these birds never appear in fresh water streams and lakes. So, from the waters of the Sitkan district there is a long list of sea birds that are unknown inland. There are also, however, some curious occurrences inland of bird species that are commonly regarded as salt water habitants purely.

Sea birds.

In the ~~nearly~~ absolute ~~restriction~~ restriction of sea birds to the sea, and their absence from fresh water, there is no question of life zones or faunal areas as explanatory of their distribution. It is to all appearance their love for salt water or else their dependance upon some condition in, or production of, the salt sea, that settles the matter. I do not know whether murrelets, auklets, and their ilk would soon pine away and die if kept captive in fresh water, as some of the antarctic penguins have been known to do, but normally these birds never appear in fresh water streams and lakes. From the waters of the Sitkan district So there is a long list of sea birds, ~~for the Sitkan district~~ that are unknown inland. As we will see beyond, they are also ~~These are, however,~~ some curious occurrences inland of bird species that are commonly regarded as salt water inhabitants purely.

The northern grebes are the large Holboell's Grebe and the small Horned Grebe. Both seek fresh water during the nesting season, and they may be found side by side on most of British Columbia lakes. Both (the Horned Grebe in far greater numbers) pass up and down the coast in spring and fall; they migrate commonly on

fresh water and on salt.

All the loons are abundant on salt water during migration, and, farther south, throughout the winter. The Great Northern Diver, here near his northern limit, is a fresh water bird in the nesting season, and is common on the British Columbia lakes, and probably nesting in lesser numbers on fresh water lakes on the Alaskan islands. The Pacific loon and Red-throated loon are more northern species, the former especially so, and neither is averse to salt water. The Red-throated loon is known to breed on the coast as far south as the Queen Charlotte Islands.

Incidentally, it may be pointed out that the Great Northern Diver, despite this label, is the most southern of his family, but he is by no means the only bird that is made to one, however, that bears an utterly inappropriate name, long usage has made to seem entirely proper: diving birds,

The list of the Sitkan district, sea birds that are peculiarly and distinctively of the salt water, includes Tufted Puffin, Horned Puffin, Rhinoceros Auklet, Cassin's Auklet, Ancient Murrelet, Marbled Murrelet, Pigeon Guillemot, and California Murre. Every one of these birds has a personal history that is well worth following up, but it may suffice here to call attention to the most common one of the lot, the Marbled Murrelet, which may be seen anywhere and everywhere in the

sheltered waters of the inner channels, despite its abundance, and which, to this day has defied the efforts of the egg collector. It is one of the very few species of North American birds whose nesting habits are practically unknown. Marbled Murrelets may be seen from the steamers almost any day between Seattle and Skagway. When in the vessel's path they flap painfully out of the way, wings used as flippers, with an appearance of crawling upon the surface of the water, and conveying an impression of utter helplessness. If approached too closely, however, they dive, and they can dive, swim, and fly exceedingly well, despite their incompetent appearance. The diving birds listed above have no prototypes in the fresh water streams and lakes of the interior.

Gulls are not all sea gulls, by any means. A vessel headed northward from Seattle will be attended by a cloud of gulls, as vessels are the world over, and in this case the flock will be mostly of the Glaucous-winged Gull, the common and characteristic species of the northwest coast from Washington to the Alaska Peninsula. This is pre-eminently a salt water bird, and rarely seen far from the coast, though it does occasionally ascend some of the salmon streams for many miles. When a traveler leaves salt-

water at Skagway and crosses the White Pass to the lake region beyond, he finds that the steamers he travels upon ~~the lake steamers plying over Yeddon and over Tagish, Atlin and other bodies of water~~ are likewise trailed by flocks of gulls, and it is only the occasional close observer who sees that the personnel of the assemblage has entirely changed. There are usually the Short-billed Gull, a smaller species than the Glaucous-winged, and abundant throughout the interior of the northwest. The Glaucous-winged soars, circles and sails alongside or behind the vessel it follows. The Short-bill is somewhat different in action in following the lake steamers. The flock trails along pretty steadily for long periods, the birds frequently uttering a rather harsh, three or four syllabled call note. Then, one, two, or three individuals will sail to one side, alight, dip up a drink, and remain there resting. When nearly lost-to sight they will arise and overtake the boat again, while in the meantime, perhaps, several others will have doffed out. And this goes on, again and again.

Another breeding gull of the interior is Bonaparte's Gull, a still smaller Grid and with (in summer) a conspicuously black head. This species cares nothing for steamers

and never follows them. The Short-billed in general habits; it breeds on islands in the lakes, perhaps three or four pairs in fairly close companionship, though not in colonies, and it bitterly and noisily resents any intrusion during the nesting season. Both the Short-billed and Bonaparte's Gull find their southern breeding limit in the northwest- in ~~extreme~~ northern British Columbia. Both migrate commonly along the coast, Bonaparte's often in compact flocks, swift-flying and almost-like waders in their direct flight.

The Herring Gull, too, breeds throughout the interior, but this is a cosmopolitan species, and, although not nesting on the coast of the Sitkan district, it is found ~~by~~ on salt water elsewhere.

The Arctic Tern is another cosmopolite. It has attained some renown as the bird that enjoys the most daylight of any, for its circumpolar northern nesting habitat with its unending summer daylight, is abandoned in the fall for a long flight to the then sun-lighted Antarctic region. The Arctic Tern has its southern breeding limit on the lakes of extreme northern British Columbia, where it is abundant; on the coast there is at least one colony in the Sitkan district, at the mouth of the Taku River, not far south of Juneau.

Another group of ocean birds of the Alaska coast is found in the petrels, represented by two species, the Fork-tailed Petrel and Beal's Petrel, both nocturnal in habits and unlikely to be found without special search. The group of petrels is cosmopolitan in its distribution, but confined to salt-water; no species is known to occur on even the largest bodies of fresh water.

The beautiful violet-green ~~colored~~ Pelagic Cormorant is common on the Alaskan coast, but it is again a salt-water species purely. The Double-crested Cormorant is common on fresh water over the greater part of the United States and southern Canada, but curiously it does not ~~so~~ extend to the apparently suitable lake region of northern British Columbia A further rather incomprehensible quirk in distribution is found in the fact that a salt-water representative of the species (the White-crested Cormorant) ~~ranges along~~ breeds on the Alaskan coast north and west of the region here under consideration, though it is not known to nest in the Sitkan District.

Ducks and Geese

Coast

Mergus americanus
Mergus serrator

Anas platyrhynchos

Histrionicus h. pacificus

Branta c. occidentalis

Inland

Mergus americanus
Mergus serrator
Sophodytes cucullatus
Anas platyrhynchos
Mareca americana
Nettion carolinense
Dafila a. tzitzihoa
Marila affinis
Glaucionetta islandica
~~Clangula albeola~~
Histrionicus h. pacificus
Oidemia d. dixoni

~~Botaurus lentiginosus~~

~~Many~~ most of the North American ducks are of wide distribution, many of them, in fact, common to the Old World as well as the New, and in ~~that~~ part of the Pacific northwest ~~there~~ that is here dealt with is a very fair representation of the family, though no such great nesting grounds ~~exist~~ as are known elsewhere in the north.

There are but few species that are confined solely to the coast or ~~solely~~ to the interior, ~~though~~ for the most part there are not a great many fresh water ducks among breeding nesting on the coastal islands. The American Merganser and the Mallard are common throughout the Sitkan District, but such birds as Green-winged Teal, Pintail, ~~and~~ Lesser Scaup, abundant in migration and in places throughout the winter, nest for the most part as scattered pairs in the occasional favorable localities.

Fresh water ducks that occur in summer in the interior of northern British Columbia are American Merganser, Red-breasted Merganser (here at its northern summer limit), Hooded Merganser (at its northern limit), Mallard, Baldpate, Green-winged Teal, Pintail, Shoveller (near its northern limit), Lesser Scaup, and Barrow's Golden-eye, ~~the last two mentioned and Buffle-head~~.

Lesser Scaup and Barrow's Golden-eye are the common species of the Cassiar district, found on every pond.

The Harlequin Duck and the White-winged Scoter are

noteworthy as maritime species primarily, which seek ~~the~~ fresh waters in the interior during the nesting season. The Harlequin during most of the year is found along rocky shores, in the most turbulent of coastal waters, surroundings that are deserted in the nesting season for hardly less turbulent mountain streams, often at high altitudes and sometimes hundreds of miles from the coast. It probably nests also along streams on the coastal islands. The White-winged Scoter flocks to the inland lakes to nest, often, where the birds are numerous, ~~many are together there are many together~~ in semi-communistic manner.

In the Sitkan District there is a species of Goose, the White-cheeked Goose (the name is meaningless), a local variety of the Canada Goose, that remains in that region throughout the year, sending but a small representation a short distance south of the breeding range in ~~summer habitat in~~ winter, and this bird is rarely ~~that rarely is~~ found out of sight of salt water. The meadows at the head of any canal are sure to be occupied by a few pairs, and in some favored localities, such as the famous "flats" at the mouth of the Stikine, many hundreds may be found gathered. In the Cassiar District of the interior there are very few geese nesting, only an occasional pair at long intervals, ~~and the~~ exact sub-specific status is unknown, as there are no breeding birds ~~no specimens~~ from that region in collections. It may very likely be the Hutchins' Goose.

Herons and Waders

Coast	Inland
	Botaurus lentiginosus
Ardea herodias fannini	
	Sobipes lobatus
	Gallinago delicata
Totanus melanoleucus	Totanus flavipes
	Tringa solitaria
	Heteroscelus incanus
	Bartramia longicauda
Actitis macularia	Actitis macularia
	Oxyechus vociferus
Charadrius semipalmatus (?)	Charadrius semipalmatus
	Aphriza virgata (?)
Haematopus bachmani	

There is but one species of heron that is found as far north as Alaska, the North-west-Coast-Heron, so called, a local, dark-colored variety of the Great Blue Heron, which in one form or another extends over ~~most~~ much of North and South America. This bird is practically restricted to the coast, where it is resident, rarely extending inland along the larger rivers, though occasionally seen in summer a hundred miles or so from the sea. The Bittern has been seen as far north as the Skeena and Stikine rivers on only one or two occasions.

Clouds of waders and of many species pass north and south along the Sitkan coast, but it is not a great breeding ground for such birds. Neither are there more than one or two species that are absolutely restricted to the coast. In the interior, on the other hand, there is quite a variety of waders among the summer visitants, but it is very likely that most of these species nest in limited numbers in the coastal region as well. We lack definite information. The Black Oyster-catcher is found nowhere away from salt water, and, furthermore, it favors the breaking surf and jagged rocks of the outermost islands. The Greater Yellowlegs is found in summer along the Alaskan coast to points north of the Sitkan District, but in the interior it appears to be replaced entirely by the closely similar Lesser Yellowlegs. The wide-spread Spotted Sandpiper nests indifferently

over both regions. The Semipalmated Plover, common in summer in the interior of extreme northern British Columbia, is known to breed on the Queen Charlotte Islands and ~~probably~~ presumably does so also in suitable parts of the Sitkan district, if such there be.

The list of breeding waders of the interior includes the following: the Northern Phalarope (apparently at its southern limit near Carcross, Yukon Territory), Wilson Snipe, Solitary Sandpiper, Bartramian Sandpiper, and Killdeer (rare, and at its extreme northern limit at Atlin). Too little is known of the nesting of these birds in this general region to make it safe to lay down definite rules covering manner of occurrence, but at any rate, in summer they all are far more common inland than on the coast.

There are two waders to which peculiar interest attaches, the Surf-bird and the Wandering Tattler, ~~Both~~ both ~~are~~ strictly sea-shore habitants during the non-breeding period, the greater part of the year, and both seeking high altitudes, above timberline, to rear their young. ~~Their~~ This is a striking and unusual seasonal distribution that is a matter of recent discovery. The Surf-bird has been found nesting thus far only on the slopes of Mount McKinley, Alaska, ~~though it~~ and has been seen in migration at one other place, at Carcross, Yukon Territory. The Wandering Tattler has been found ~~in the~~,

in summer at several points, at Prince William Sound on the Alaskan coast (northwest of the region here considered), in the interior of Alaska, and on inland mountains ~~in the interior~~, south of the Stikine River.

In reviewing the long list of water birds of the northwest, it is apparent ~~that there is no~~ any division of species, of the Sitkan district and of the interior, respectively, is not (with the exception of a few) to be ~~based upon~~ based upon, or explained by, any features of topography or climate ~~that~~ are peculiar to these regions. The sea birds (~~coons~~ loons, murres, petrels, cormorants, etc.) are species that are wide ranging, many of them cosmopolitan, but upon salt water mostly or altogether; the fresh water ducks, abundant inland and scarce on the coast, breeding are again wide ranging species ~~that~~ merely fail to find any extensive areas on this coast that are suited to their needs. The same appears to be true of many of the waders. Among the gulls, however, there are locally restricted species, upon the coast and inland, one replacing the other in closely comparable surroundings. Then, the White-cheeked Goose is a good example of a strongly marked local variety of a wide-spread species, that is closely confined to its own restricted habitat by intangible but obviously potent barriers. ~~potent barriers.~~ There is nothing in the character of the interior to inhibit the ~~forest~~ common presence of the species, the Canada Goose, but there is something that emphatically does bar the presence of this particular variety of the Canada G... the White-cheeked G...

from water birds
Passing to the more numerous land birds, a very different
in manner of occurrence.
condition is found to prevail. Even among the water birds,
wide spread as most of them are, different species predominate
so markedly in one region or the other as to give a decidedly
different aspect to the aquatic ~~of~~ avifauna of the two
sections, but of the land birds there are very few indeed
that are found both on the coast and in the interior, and
hardly
~~not~~ one that is equally abundant in both places. It is not
particularly the land birds,
too much to say that in the bird life, as in the plant life,
east and west of the dividing Coast Range (a barrier
from thirty to sixty miles wide), the observed differences
are as great, and of about the same sort, as those
between California and Minnesota (or even Maine). Taking
up the land birds, group by group, it will be seen that
throughout the entire list there are replacements of closely
related forms in the two sections

~~First the grouse. Of the Blue Grouse (genus~~
~~Dendragapus), there is inland Fleming's Grouse, a~~
~~dark colored northern variant of Richardson's Grouse of the~~
~~Rocky Mountains~~
~~northern British Columbia; on the coast is the Sitka~~
~~Grouse, a northern variant of the Sooty Grouse of~~
~~Vancouver~~
~~Island and adjacent mainland, the northern coastal~~
~~through~~
region (Vancouver Island south to the Californian Sierra Nevada).

Grouse

Coast	Interior
Dendragapus f. fuliginosus	Dendragapus o. fleminqi
Dendragapus f. sitkensis	
Canachites c. atratus	Canachites c. osgoodi
Canachites franklini	Canachites franklini
	Bonasa u. umbelloides
Sagopus l. alexandri	Sagopus l. albus
Sagopus r. dixoni	Sagopus r. rupestris
	Sagopus l. leucurus

Of the "Blue Grouse" aggregation (genus Dendragapus), inland there is Fleming's Grouse, a northern variant of the Hudsley Grouse of the southern Rocky Mountains. ~~On the mainland~~ coastal district the Sooty Grouse occurs on the mainland, this being the northern limits of a habitat that extends southward over Vancouver Island and into northern California. On the coastal islands is the Sitka Grouse, a variety of the Sooty, the female of ~~Sitka Grouse~~ this form being bright ruddy chestnut in general coloration and is one of the most beautiful of North American grouse. Other varieties of the Sooty Grouse extend southward as far as southern California.

It will be noted that there are here two well defined forms (Sharp-tailed Grouse and Sooty Grouse), which, as several subspecies, extend north and south, the one from Oregon to the Yukon, the other from southern California to Glacier Bay, the Coast-Ranges between.

Then the Spruce Grouse (genus Canachites), which in one form or another extends across subarctic North America, from Atlantic to Pacific. A north-western ~~variety~~ subspecies, the Alaska Spruce Grouse, ranges southward into British Columbia to a point about midway between the upper Stikine and Skeena rivers. A ~~southern~~ southwestern variety (regarded as a distinct species), Franklin's Grouse, ranges northward through ~~South~~ British Columbia to ~~the~~ the same point. The Alaska Spruce Grouse is represented upon the coast, in the northern part of the Sitkan District, by a faintly distinguished subspecies, the Valdez Spruce Grouse, apparently in scanty numbers throughout its range. Franklin's Grouse, of the interior in southern British Columbia, is known to reach the coast in the northern part of the Sitkan District, on Zarembo, Prince of Wales, and Hall islands, and perhaps on others. Island birds are believed to ~~as~~ be slightly differently colored from the inland race, but there are very few specimens extant in any museum, too few to settle this point.

The general distribution of Canachites is thus very different from that of Dendragapus. The latter is ~~a western group~~ confined to western North America, its ~~forms, with~~ distribution extending north and south.

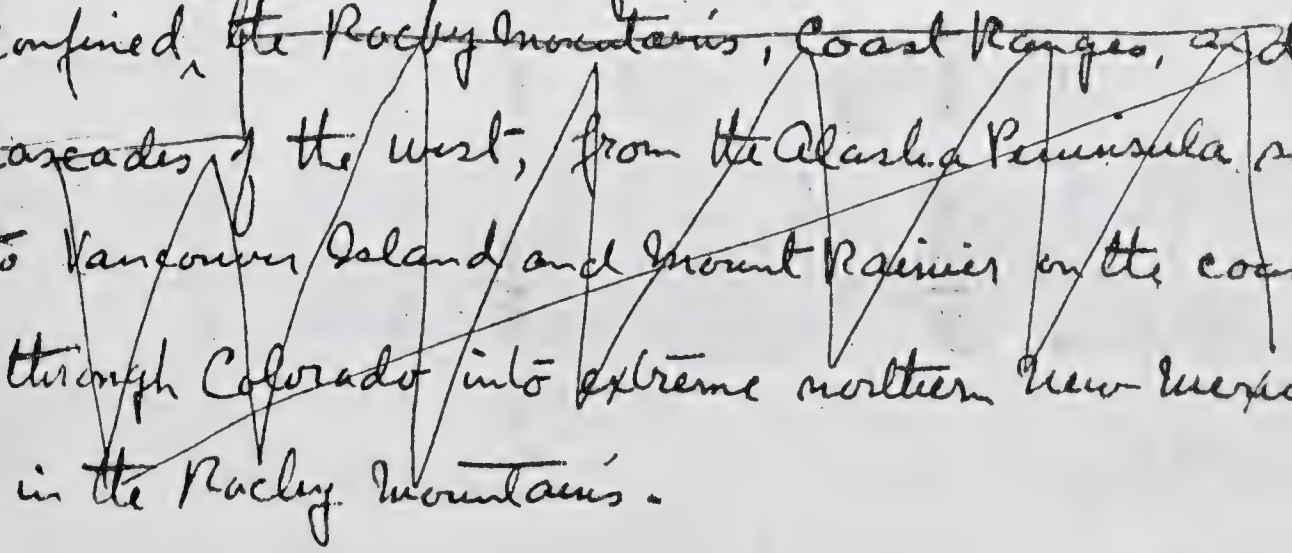
Canadiles extends east and west across the continent, and, barely reaching the shores of the Pacific, has there, perhaps, begun to develop newly characterized subspecies in that region, a region that has so potently affected the appearance of nearly all forms of animal life within its bounds.

Blue Grouse and Spruce Grouse are birds primarily of the coniferous forests, but the Ruffed Grouse (Bonasa) is found almost entirely in deciduous woods. Its habitat is indicated by the local name in use throughout the northwest, Willow Grouse, its favorite haunts the lowland thickets of willow and poplars. In its several subspecies the Ruffed Grouse extends across North America from ocean to ocean, somewhat farther south than the Spruce Grouse. The northwestern subspecies, the Gray Ruffed Grouse, occupies the interior of British Columbia and Alaska, and another western subspecies, the Oregon Ruffed Grouse (an extremely reddish-colored bird) is found upon Vancouver Island and the adjacent mainland. It is noteworthy that neither of these forms reaches the coast of southeastern Alaska, though at first thought it would seem reasonable to expect to find the Oregon Ruffed Grouse ranging northward into that region. The explanation probably lies in the absence of any considerable amount

of deciduous woods in the Alaskan coastal belt, the nearest substitute, the relatively restricted thickets of scrubby willow and alder, probably not fulling the bird's needs.

The remaining grouse of the northwest, the several species of Ptarmigan, are birds of many unusual aspects of plumage, habits, and life history, so much so that it is difficult to avoid here elaborating upon various of these features, irrelevant to the distribution of the several forms.

There are three species of Ptarmigan in North America, Willow Ptarmigan, Rock Ptarmigan, and White-tailed Ptarmigan, each of which has one or more local subspecies in the northwest. The Willow Ptarmigan is circumpolar in distribution, ranging across northern Europe, Asia and North America. The Rock Ptarmigan, closely similar to the Old World Lagopus mutus, is the northernmost of the three, extending far toward the pole. The White-tailed Ptarmigan is purely American, being confined to the mountains of the west.



Mention should be made, though, of the striking characters of the ptarmigans, namely their seasonal changes of plumage, from brown or gray in summer, to white in winter.

~~In the interior~~

The Willow Ptarmigan is represented by different subspecies in the interior and on the coast, and the Rock Ptarmigan, too, has different subspecies inland and on the coast. The White-tailed Ptarmigan is only in the interior. The Willow Ptarmigan (Lagopus lagopus albus), inland occupies during the summer the lower mountain slopes and valleys immediately above timber line, down to about the 3,000 foot contour. It ranges southward at least as far as the upper Skeena River and the Telkwa Pass. The coastal variety (Lagopus lagopus alexandrae) is found at sea level in the northern part of the Sitkan district, but farther south (on Prince of Wales and adjacent islands) it remains almost entirely on the mountain tops, largely, perhaps, on account of the ~~lack of~~ absence of suitable open covering at lower levels. Its southern limit on the coast is ~~a little~~ at about the same latitude as the inland subspecies.

The Rock Ptarmigan (Lagopus rupestris rupestris inland, L. r. dixoni on the coast) is a bird of high altitudes in both regions, on bleak, wind-swept peaks and ridges on the Alexander Archipelago, on ~~deserted~~ high

elevations, but not of rugged character, in the interior. Inland it extends southward, ~~in small~~ not commonly, at least as far as certain mountain tops near Hazelton. On the coast, dixoni is more restrictedly northern, having been found only on Baranof and Chichagof islands and on the adjacent mainland.

The White-tailed Ptarmigan (Lagopus leucurus) is of interest on several counts. It is purely North American, whereas the other two species range clear around the globe. It also displays ~~the~~ two apparently anomalous characters, ~~of~~ as follows: It is the most highly specialized of the ptarmigans in its entirely white winter plumage, for white lagopus and rupestris have coal-black tail feathers, ~~winter~~ summer and winter, in leucurus the tail feathers are white at all times. Thus, in winter plumage it is pure white throughout, exemplifying the extreme development of the white seasonal plumage. ~~that characterizes the~~

At the same time, instead of being one of the most northern of birds, a feature that might have been anticipated as an accompaniment of such extremely

specialized winter plumage, it is by far the most southern of the New World ptarmigan, ranging along the ~~Rocky~~ Coast-Ranges and Cascades to Vancouver Island and Mount-Rainier, ~~to~~ along the Rocky Mountains to the northern ~~part~~ boundary of New Mexico. In the north, as in the south, ~~at least~~, the White-tailed Ptarmigan frequents high altitudes and the most bleak and precipitous surroundings, far more so than the Rock Ptarmigan. In fact, it goes in some places by the name of "Rock Ptarmigan", from the nature of its habitat, while the true Rock Ptarmigan is either confused with the larger Willow Ptarmigan or else known as "Croaker", from its call notes. Curiously, the White-tailed Ptarmigan does not occur on the coast of southeastern Alaska or of British Columbia north of Vancouver Island. Perhaps it is better to modify that statement to the effect that the species has never yet been found in that section, ~~on the coastal slope of the Coast-Range, or on the islands, of the Sitkan district~~; but the region is ~~so~~ rugged and explorers have been few. At any rate, the other two species of Ptarmigan have been found there, but not the White-tailed.

In summarizing the manner of distribution of the grouse of the north it will be noted that both in the interior and on the coast there are some species at low levels, others at higher elevations. It will be noted that there are closely related (but distinct) races occupying, respectively, each of the lowlands of the two regions, other closely related (but distinct) races at the higher altitudes. There is, however, still another feature to the distribution of one of the groups concerned: The Blue Grouse (Dendragapus) on the coast is a bird of the lower levels, occurring at sea level. In the interior it is found breeding only at high altitudes, about at the timber line level, and it only sporadically descends into the lowlands at the end of the summer.

Hawks

Coast	Interior
	Circus hudsonius
Accipiter velox	Accipiter velox
Astur atricapillus striatulus	Astur atricapillus atricapillus
Buteo borealis calurus	Buteo borealis harlani
	Buteo swainsoni
	Aquila chrysaetos
Haliaëetus leucocephalus alascanus	
	Falco rusticolus
Falco peregrinus anatum	Falco peregrinus anatum
~~Falco peregrinus pealei~~	
Falco columbarius	Falco columbarius
	Falco ~~sparverius~~ sparverius
	sparverius
Pandion haliaëtus carolinensis	Pandion haliaëtus carolinensis

Hawks ~~as a rule~~ generally nest as widely scattered pairs, and ~~they are of~~ most species are extremely secretive and quiet during the breeding season, so that it is ~~better~~ sometimes hazardous to venture upon generalizations regarding their distribution. A comparative list, as given above, is bound to invite attack, more or less justified. It is, nevertheless, useful as illustrating certain points I wish

to make, and it may stand therefore with all its imperfections. ~~many~~ of the species listed require modifying or explanatory comments in support of their position in one or the other column, but there are several that are excellent examples of the sort of differences commonly prevailing between the two regions. ¶ The Marsh Hawk is primarily of the interior, and I do not know that it has ever been found nesting in the Sitkan district, where it is a common migrant. The Sharp-shinned Hawk, ~~#~~ wide ranging across the continent, is apparently in both regions. The status of the Goshawk is debatable. For years there was been general ~~acceptance of the~~ belief in the existence of a dark-colored coastal subspecies peculiar to the north-west, a belief that is at present ~~under~~ suffering ~~some~~ criticism. At any rate, the Goshawk is far more abundant in the interior than on the coast, though in any given region its numbers fluctuate widely from year to year.

The Red-tailed Hawks divide in ~~the~~ a more satisfactory manner. In the Sitkan district is ~~a Red-tail that is essentially like~~ the Western Red-tail, of wide distribution farther south, from the Rocky Mountains to the Pacific. From central British Columbia

northward the habitat of the Western Red-tail narrows to an attenuated strip along the coast, throughout the Sitkan district, where, however, this Red-tail is a decidedly uncommon bird. East of the Coast ranges it is abruptly replaced by the strikingly different Harlan's Hawk, almost coal black and with the tail marked with whitish and practically destitute of red. This is a bird with an interesting history. Discovered by Audubon in Louisiana (year?), it was until recently believed to be restricted to the Gulf coast, in reality its winter home, while many ornithologists were outspoken in their disbelief in its existence at all, as a race. It is, however, a far northern variety of the Red-tail, summering in adjacent parts ~~of the interior~~ of Alaska, Yukon Territory and British Columbia, and migrating southeastward in the fall, east of the Rocky Mountains and down the Mississippi Valley.

Swainson's Hawk, too, "stays put", geographically, in a very satisfying manner, absolutely eschewing the coast and restricting itself to the interior, and to the open country thereof, which means usually above timber line.

The Northern Bald Eagle probably spends across

the continent, but it is so characteristically a bird of the coast, and is so rare in ~~the part of the~~ the northern interior of British Columbia, that it seems proper to list it among the coastal birds. There are probably a pair or two of Bald Eagles to be found about any large inland lake, where fish are to be had, but on the Alaskan coast, before the recent depletion of the Eagles ~~numbers~~ from the bounty placed upon them, they existed in numbers that were well-nigh incredible for such a large predatory bird. The Golden Eagle, on the other hand, cosmopolitan in general distribution, is here closely confined to the eastward of the Coast Range. It is, I believe, absolutely unknown upon the sea coast, though not uncommon inland.

The Black Hawk, or Peregrine Falcon, another cosmopolite that varies slightly in appearance in different parts of the world, can hardly be safely restricted to one columun or the other. ~~It has been~~ It probably nests in both regions, though not commonly in either. Its discovery actually nesting in the Sitkan district is of especial interest in that another strongly marked form of the Peregrine, Peale's Falcon (Falco peregrinus

pealei), apparently replaces it entirely in the Queen Charlotte Islands to the southward, and on the Alaskan islands to the northwest, from Kodiak to the shores of Asia. It may be said that the apparently discontinuous breeding range of the Peale's falcon does not look so singular when it is plotted upon a globe, for the Aleutian Islands are then seen to lie almost directly west of the Queen Charlottes and scarcely any farther north, and the Sitkan district is not the intervening territory that it would seem to be. So Peale's falcon, despite the positive statements in many books of its nesting along the whole Alaskan coast, apparently leaves the Sitkan district to the occupancy of its cousin, the Black Hawk.

The Gyrfalcon is a boreal species ~~that~~ summer ~~barely crosses the~~ extends southward barely into the northern interior ~~confines~~ of British Columbia, ~~as~~ a rare inhabitant there of the open country above timberline.

The Pigeon Hawk is so secretive in its nesting that in several years field work in the northwest I have never so much as seen one of the birds during the nesting season. Toward the end of the summer

~~Pigeon~~ Hawks usually appear in some numbers, both on the coast and inland, migrating southward. This is a species that extends across the continent in its general distribution, breeding assuredly in the northern interior. Whether or not it actually breeds on the coast of southeastern Alaska (the Sitkan district), where it is a common migrant, I do not know. There is an extremely dark-colored form of the Pigeon Hawk, so distinctive in appearance that it has been granted a separate name, the Black Merlin (Falco columbarius suckleyi). ~~This~~ It has been assumed, that this is a northwest coast variety, of dark color as are so many of the birds of that region, and entirely replacing the true Pigeon Hawk ~~of~~ on in the humid coastal belt. ~~The~~ Its nesting grounds of the Black Merlin, have never been found, however, nor, I believe, has the bird itself ever been taken on the coast north of Vancouver Island, while southbound migrants have been shot in the interior as far north as Atlin. It is thus at least an open question as to whether the so-called Black Merlin

may not be a color phase of the Pigeon Hawk (just as there are dark colored and pale colored Swainson's Hawks and Rough-legged Hawks), but a color phase perhaps of limited geographical distribution, possibly in the northwestern interior. ~~The black phase~~ It would not be the first time that a color phase was dignified by a separate name. The coal black form of the American Rough-legged Hawk is a case in point.

The Sparrow Hawk shuns the coast north of Vancouver Island, but extends into Alaska in the interior. It is a bird that prefers open country or a region of scattered trees, and it may be, that its appearance on the coast is barred by the dense ~~coastal~~ forests of the region rather than directly by any climatic feature. ~~of the coast that bars its appearance~~. I have seen one or two stray individuals at points on the mainland coast, as at the mouth of the Stikine River, during migration at the end of the summer, but the Sparrow Hawk is only a rare straggler in that section.

The Osprey is widespread over North America, and it occurs both inland and on the coast, though nowhere

in abundance. It is apt to be found about any large 8
body of water where there are ~~large~~ good-sized fish to be caught

Owls

Coast

Interior

Asio wilsonianus

Asio flammeus

Scotiaptex nebulosa nebulosa

Cryptoglaux ~~Cryptoglaux~~ funerea richardsoni

Cryptoglaux acadica

Cryptoglaux acadica

Otus asio kennicotti

Bubo virginianus saturatus

Bubo virginianus subarcticus

Bubo virginianus lagophonus

Surnia ulula caparoch

Glaucidium gnoma grinnelli ~~Glaucidium gnoma grinnelli~~

If we must beg off from supplying exact information regarding the distribution of certain of the hawks, it will be understood that the nocturnal owls offer still greater difficulty in plotting the precise ~~exact~~ limits of their distribution. ~~But~~ Here again, however, we can to some extent discern the workings of distributional laws such as affect the most of the animal and plant-life of the regions.

The Short-eared Owl nests far to the southward and far

to the northward of this part of the country, but it shuns the heavily wooded coast. The Long-eared Owl is a southern bird, ~~almost~~ extending northward regularly as far as the interior of central British Columbia. The collecting of a single bird by myself on the Lower Taku River, near the Alaska-British Columbia boundary, in September, 1909, is an isolated occurrence the meaning of which is not yet clear, as the species has never been found in the adjacent interior nor elsewhere on the coast.

~~and Richardson's Owl are both of them~~

~~The Great Gray Owl is a~~ bird of dense woods, but still ~~as~~ interior species solely; ~~it has~~ they have not yet been found in the coastal forest.

The Acadian Owl presents some ~~interesting~~ peculiar points. It is sub-arctic (that is, of Canadian and Hudsonian life zones) in its distribution, extending across the continent from ocean to ocean, ~~extending~~ even into the Sitkan district. On the Queen Charlotte Islands there is what appears to be a perfectly distinct (though closely related) species, Fleming's Owl (Cryptoglaux flemingi), confined to those islands; the Acadian Owl apparently visits the Islands during the winter months.

(The Great-Gray Owl, Richardson's Owl, and the Hawk Owl, are all of them

The Great-Horned Owl, responsive as it is to varied local conditions throughout its ~~coast~~ extensive habitat, occurs as different subspecies on the coast and inland. The dark colored coastal form, the Dusky Horned Owl, is found throughout the Sitkan district. Inland are two paler colored forms, the Arctic Horned Owl, ~~in the~~ from the Carrian district northward, is a very whitish bird. In the Unimeca district there is a ~~&~~ more brownish colored form, the "northwestern Horned Owl" (a manufactured "book name", if ever there were one). In the interior, one or the other of these two subspecies are periodically and locally of great abundance, depending mostly upon the condition of the rabbit-population. The Dusky Horned Owl is the only species of owl that is of even fair abundance upon the coast.

We know little about the Pigmy Owl in this region. It does occur as far north as the Stikine River, both inland and at the mouth of that stream, but it is a rare bird at both places.

~~Swifts~~

Nighthawk, Swifts and Hummingbird

Coast	Interior
	Chordeiles v. virginianus
Cypseloides n. borealis	Cypseloides n. borealis
Chaetura vauxi	Chaetura vauxi
Selasphorus rufus	Selasphorus rufus

The same Nighthawk that ~~as~~ raises its broods upon the graveled roofs of smoky cities on the Atlantic coast does so also in the ~~open~~ open woodland of northern British Columbia. There it does not pass beyond the Coast-Range, and it is unknown in the Sitkan district, but it is common over the southern mainland of British Columbia and even over Vancouver Island.

Black Swift and Vaux Swift both extend northward to about the same latitude in the Cassiar district and in the Sitkan district. Both are common in the Skeena Valley, and uncommon in the upper Stikine Valley, apparently their northern limit. The Black Swift

is abundant on the Alaskan coast at least as far as the mouth of the Stikine, and Vaux Swift, much less numerous, extends about as far north. Neither is found on ~~the outer islands~~ any but the innermost islands. The Rufous Hummingbird is common in the upper Skeena Valley, much less common in the upper Stikine Valley, and decidedly rare in the Atlin region; ~~about Atlin~~ where one may see, perhaps, two, three, or four birds during a summer. It ranges north along the Alaskan coast through the length of the Sitkan district, so there is little difference in manner of occurrence on the two sides of the Coast-Range.

Tanager and Swallows

Coast	Interior
	Piranga ludoviciana
	Petrochelidon l. lunifrons
Hirundo erythrogaster	Hirundo erythrogaster
Iridoprocne bicolor	Iridoprocne bicolor
	Tachycineta t. lepida
	Riparia riparia
	Stelgidopteryx serripennis

Tanagers are premarily ~~southern~~ tropical or sub-tropical in habitat, and only one species extends up into the Canadian north west. The Louisiana Tanager is common in southern British Columbia, it extends northward in the interior in ~~fair~~ some abundance as far as the Omineca district, about Hazelton, and its normal northern limit is apparently the upper Stikeen valley, where it is uncommon. There is a record of a specimen collected on the Alaskan coast, at the mouth of the Chickamin River, where it was apparently nesting, a place where other inland birds also were found.

Swallows are rather rare in the coastal region. Only two species occur there in any numbers, the Barn Swallow and the Tree Swallow, and even they are not nearly so abundant there as they are in the interior. Also, they are mostly along the mainland coast and on the inner islands, of relatively rare occurrence farther west. The swallows nearly all ~~nest~~ thrive about human habitations, and on the coast the Barn Swallow, in the interior Cliff, Barn, Tree, and Violet-green swallows, all seek the small towns and even the scattered single cabins, where they nest in whatever nooks and crannies are available, or in bird houses, eagerly occupied wherever they are set up. In Telegraph Creek I had pointed out to me a Barn Swallow's nest, on a ledge by a window, that had been added to, year after year, until it resembled a story-book picture of a Flamingo's nest. ~~In Atlin~~ ~~Near~~ At the Portage near Atlin a pair of Barn Swallows, summer after summer for many years,

occupied a nest ~~in~~ a box attached to the roof of a railroad car, a car that traveled back and forth across the Portage at frequent intervals. ~~The Violet-~~ The Cliff Swallow has never been taken on the coast. ~~Green Swallow~~

The Violet-green Swallow occurs in small numbers on the Alaskan coast, at least in late summer; it is not known ~~to~~ to breed there. The Rough-winged Swallow finds its northern limit in the vicinity of Hazelton, in the upper Skeena Valley, while the Bank Swallow goes very far north. ~~, but both species are unknown in the Subarctic~~

Waxwings, Shrike and Vireos

Coast

Interior

Bombycilla garrula pallidiceps
Bombycilla cedrorum
Lanius borealis
Vireo ~~sylva~~ olivacea
Vireo ~~gilva~~ gilva swainsoni

The Bohemian Waxwing is Boreal, the Cedar Waxwing Temperate Zone, in their summer distribution, and northern British Columbia is one of the few places where their ranges nearly adjoin. The American subspecies of the Bohemian Waxwing is a slightly differentiated (paler-colored) variety of a circumpolar species; in America its breeding ground is ~~exclusively~~ apparently entirely in the northwest, though it sweeps southeastward in ~~the~~ its winter travels. It seems curious that despite its obvious Asiatic connections, this species sedulously avoids the Pacific slope forests and remains east of the coast ranges. There is more than a suggestion here of the forces that have permitted the population of the coastal district from southern sources, to the ~~debarment~~ debarring of

immigrants from the north. The Bohemian Waxwing breeds commonly as far south as the Stikine Valley, probably somewhat farther south, as molting birds appear in the upper Skeena Valley before the end of the summer.

The Cedar Waxwing nests in interior British Columbia as far north as the Skeena Valley. Its occurrence in Alaska rests upon one July-collected bird from the lower Chickamin River, a locality that yielded various other species of the interior.

The Cedar Waxwing is not quite so intolerant of coastal conditions as is the Bohemian and this one occurrence may perhaps be indicative of a future trend in distribution. So far, Bohemian and Cedar waxwings have not been found nesting in the same locality but it is not unlikely that they will be. Both are notoriously erratic in the direction and extent of their migrations and probably irregular, year to year, in the choice of breeding grounds.

The Northern Shrike presents certain parallels to the Bohemian Waxwing. It, too, is probably ~~a~~ a New World representative of an Old World species (though not generally recognized as such), and of very much the same general summer distribution as the Waxwing, though probably rather more extensively ~~too~~ toward the east. While apparently similar in origin and mode of dispersal, the Northern Shrike suggests a ~~somewhat~~ possible greater antiquity in its arrival in America, in its slightly more marked differentiation from the parent stock and in its wider distribution in ~~America~~ its newer home. As with the Waxwing, the Shrike has a related species ~~in more~~ farther south in North America, but with the shrikes the gap is far wider between the northern and the southern species. The Northern Shrike nests southward barely below the northern boundary of British Columbia, in the Atlin region. It avoids the ~~coast~~ Pacific slope absolutely during the breeding season, and only a very few individuals wander out to the Alaskan coast at other times.

The Red-eyed Vireo, primarily of eastern North America, ranges north-westward across southern British Columbia even to Vancouver Island, and northward in the interior to the Skeena River (at Hazelton). This apparently is its extreme limit in that direction, for although I saw several thereabout, ~~in fact~~ twenty miles to the northward in Kispiox Valley, in similar surroundings, none was ~~seen~~ found. The Western Warbling Vireo is in a different category in that it is the western representative of a wide spread species, instead of the eastern, as is usually the case in the northwestern interior, extending northward over a wide front. It is common in the Skeena Valley, and, farther north, much less numerous in the Stikine Valley and decidedly rare in the Atlin region. It is unknown upon the Alaskan coast.

Warblers

Coast	Interior
Vermivora celata lutescens	Vermivora celata celata
	Vermivora celata orestera
	Vermivora peregrina
Dendroica aestiva rubiginosa	Dendroica aestiva aestiva
	Dendroica coronata hooveri
	Dendroica auduboni auduboni
	Dendroica magnolia
	Dendroica striata
Dendroica townsendi	Dendroica townsendi
	Seiurus ~~noveboracensis~~ notabilis
	Oporornis tolmiei
	Geothlypis trichas occidentalis
Wilsonia pusilla pileolata	Wilsonia pusilla pileolata
	Setophaga ruticilla

The coastal region is decidedly poor in its representation of warblers, both as regards species and individuals, while the inland woods, in contrast, have a decidedly abundant warbler population. We naturally associate these birds with sunshine and brightness, so it is no surprise to find the dark Alaskan forests so nearly destitute of them.

Of the four warblers that nest in fair numbers in the Sitkan district two (Sulescent and Alaska Yellow) are coastal variants of widespread species, and two (Townsend's and Pileolated) are western forms that occur unchanged on both sides of the coast-range. The Sulescent Warbler is a strongly marked subspecies that ranges from Alaska south to southern California, west of the Coast Ranges in the north, west from the Sierra Nevada in California. The Alaska Yellow Warbler is a slightly differentiated subspecies of limited distribution along the coast of Alaska and northern British Columbia. East of the Coast-Ranges it

East of the Coast Ranges it is replaced by the Orange-crowned Warbler and the Western Orange-crown, of neither of which the exact distributional limits are known.

is replaced by the Eastern Yellow Warbler (at least these birds resemble the eastern form more nearly than any other), which ranges throughout the interior of Alaska and northern British Columbia. ~~In the~~ The coastal-inhabiting Alaska Yellow Warbler ascends the Skeena Valley at least to the Hazelton region, where, however, the Yellow Warbler population is of a betwixt-and-between nature, as between the Alaska and Eastern subspecies.

Townsend's Warbler is a western species that at the northern extreme of its range, in southern Alaska, is almost exclusively coastal. It can be found in the Atlin and Telegraph Creek regions, but only by close search in certain limited types of surroundings; farther south it extends eastward, even as far as Montana. The Pileolated Warbler, a western subspecies of a wide-ranging North American bird, occurs both inland and on the coast. It is mostly on the mountain tops in the interior; in the Sitkan district it is most common along the mainland coast and on the inner islands, progressively rarer toward the outermost islands.

The Tennessee Warbler, Magnolia Warbler, Black-poll Warbler, and Redstart are all eastern species that range west and north for varying distances, the Magnolia to the upper Skeena Valley, the Redstart commonly to the Stikine Valley, in small numbers to Atlin, the Tennessee and Black-poll northward beyond the British Columbia boundaries. They are among the many birds that distinctly characterize the north-western interior; none has been taken ~~upon~~ within the Sitkan district. I have seen Redstarts in the late summer on the Stikine at Great Glacier, just above the British Columbia - Alaska boundary, and it is a species that should be looked for as a straggler into Alaskan territory at the mouth of that stream.

Hoover's Warbler (a faintly characterized sub-species of the wide-spread Myrtle Warbler) and Audubon's Warbler are complementary in their

distribution, but both characteristic of the country east of the Coast Ranges. Audubon's Warbler, in southern British Columbia ranging across the mainland and over Vancouver Island, retreats from the coast ~~a little farther~~ north of that latitude. It is abundant in the Omineca district, the northern boundary of its habitat lying probably from twenty to fifty miles north of Kispiox Valley. Hoover's Warbler is abundant about Atlin, much less numerous about Telegraph Creek; its southern breeding limits ~~are probably~~ may lie about midway between the Stikine and Sheena rivers. It probably nests along the Stikine almost to the International Boundary, and it is one of the species that might be expected eventually to establish itself upon the coast. ~~Its "niche" there assuredly~~ This is an aggressively successful bird, its "niche" ~~upon~~ in the Sitkan district is assuredly unoccupied, and there are places therein

that do not seem unsuited to it. It already occurs as a transient, mostly as immatures, descending the big rivers in the fall, then southward along the mainland coast; it is a decidedly uncommon spring migrant, and then only on the mainland and on the innermost islands.

Grinnell's Water-thrush occurs throughout most of the interior of British Columbia. I have seen it at nearly every point I have visited in the upper Skeena and Stikine valleys and at Atlin, but always as a rarity, requiring careful search. It ranges much farther north, but shuns the coast, never having been taken in the ~~Ste~~ Sitkan district.

Tolmie's ~~Macgillivray's~~ Warbler practically duplicates Audubon's Warbler in its distribution in the northwest: Across ~~B~~ Northern British Columbia and over Vancouver Island, back from the coast from there northward, common in the Omineca district, and rare in the Telegraph Creek region, its northern limit. ~~Breeding colonies are established~~ This appears to be distinctly a species that is extending its habitat,

pushing westward where favorable openings appear. Breeding colonies are established at various points on the southern mainland of the Sitkan district, at the head of Boca de Quadra Inlet, on the ~~lower Chuituna~~ Chickamin River, and at and there are adjacent ~~mount~~ islands where the species might be expected to appear.

The Western Yellowthroat has essentially the same distribution as the Tolmie Warbler in southern and central British Columbia, and it, too, has thrust westward on extension of its summer habitat along the Chickamin River to salt-water. Although an abundant bird in the Ominica district, it is apparently ~~seemed to be~~ absent from the Stikine Valley, which is puzzling, as I did find it migrating, not uncommonly one September along the lower Taku River, Alaska, which is still farther north. It is a rare migrant in the Atlin region, from where the Taku drainage descends. Somewhere to the eastward of Atlin there must be other nesting grounds of the Western Yellowthroat.

Pipit, Dipper, Catbird, Wrens and Creeper

Coast	Interior
	Anthus rubescens
Cinclus m. unicolor	Cinclus m. unicolor
	Heumetella carolinensis
	Troglodytes a. parkmani
Nannus h. ~~pacificus~~	~~Hoonicus h. pacificus~~
Certhia f. occidentalis	

The Pipit is a common migrant & coastwise as well as inland, but so far as known it nests only in the interior. It occupies an ~~interior~~ Alpine-Arctic habitat over much of western North America, including most of the above-timberline summits and plateaus of the Canadian and Cassian districts east from the inner side of the Coast-Ranges. There it may be found in company with Rock Ptarmigan, Horned Lark, Golden-crowned Sparrow, and sometimes with Hepburn's Rosy Finch.

The Kingfisher occurs indifferently throughout the Sitkan district and inland, though seldom in any numbers at any one place. Presumably the nature of ~~their~~ its habitat along the rushing streams is such as to permit entry into adjacent new territory just as fast as it becomes available. The species is tolerant of a wide range in temperature and humidity, and with every valley and cañon affording habitable surroundings there has evidently been nothing to hinder the spread of the Kingfisher over this whole northwestern country. It is, moreover, resident the year through, despite the extremely low winter temperatures that ~~seal~~ in part ~~much~~ of this section seal up most of the running streams on which its living depends.

The Catbird seems decidedly out of place amid its sub-arctic associates, but must be included here on the basis of one bird, unmistakably breeding, that was taken near Hazelton, on the upper Skeena River. This is the northwestern limit of the species, common in southern and central British Columbia, but not, I think, to be regarded as an isolated occurrence, unlikely to be repeated. It seems to me that the Catbird may well be one of the birds that has been following up the spread of cultivation and habitations toward the northwest, eagerly occupying clearings and second growth in the forest, and prepared to hold its ground in the altered surroundings. The Western House Wren comes into our list on exactly the same basis as the Catbird (one specimen collected near Hazelton),

and is probably to be regarded in exactly the same light, again a species to which dense forest is repellant, common a little farther south and pushing northward as partly cultivated clearings are available.

Of very different stripe is the Western ~~House~~ Winter Wren, habitant of densest forest and driftpiling surroundings. ~~Haunt of~~. Primarily of the coast region, Winter Wrens of various subspecies extend from the Sitkan district northward and westward the length of the Aleutian Islands to a close connection with ~~related~~ Asiatic relatives.

Throughout the Sitkan district the Western Winter Wren is abundant and in all sorts of surroundings. On the eastern slope of the Coast Range it is rare and only to be found at

high altitudes, as I have seen it on a mountain near Hazellon (4,000 feet), and above the central ~~middle~~ Stikine (3,000 feet). I was unable to find the species in the Atlin region, though it may occur on the western side of Tagish Lake.

The Brown Creeper in its several subspecies occurs over most of North America; there are some curious anomalies in its manner of distribution in the northwest. The Tawny Creeper is the subspecies of the humid coast-region, a well-marked variety ~~of~~ of fairly common occurrence in the ~~Sitk~~ Sitkan district and southward to California. It is closely restricted to the region west of the Coast-Range, and in the Sitkan district it is found over mainland and islands, though as with all other small birds in lesser numbers on the westernmost islands. East of the

Coast-Range, in the Umineca, Cassiar and Alkin regions is a vast extent of country that is apparently well suited to the Brown Creeper's needs and in which no Brown Creeper is found. I believe that a very few migrants do pass through (I have seen one or two, in fact), but the species is not known to breed there. The Rocky Mountain Creeper is the form that would be expected to occur, and the curious fact of its absence is emphasized by ~~the~~ its known occurrence far to the north west- in Alaska.

The Brown Creeper is one of a considerable list of birds that is most unaccountably absent from this region.

Kinglets

Coast

Regulus satrapa olivaceus

Regulus calendula grinnelli

Interior

Regulus calendula calendula

As a species the Golden-crowned Kinglet ranges across the breadth of ~~North America~~ the continent, but it is not as variable as the Ruby-crowned and the two North American subspecies, Eastern and Western, are very faintly differentiated. In the Sitkan district the Western Golden-crowned Kinglet is of general distribution and of fairly common occurrence, as birds go in that region. It is, in fact, one of the characteristic species of the south-eastern Alaskan forests. Inland it is extremely rare and restricted to the higher altitudes. I have seen it there, in fact, only in places where ~~it might~~ the birds might

be regarded as an overflow from the coastal region, on or near the east face of the Coast Range.

In contrast, the Ruby-crowned Kinglet is found in fair abundance in both regions, as two rather strongly contrasted subspecies. The Sitkan Kinglet, a dark-colored coastal form, the Eastern Ruby-crown, of paler coloration, each remains absolutely upon its own side of the dividing mountain range. As with the Golden-crown, the Ruby-Crown ~~in~~ the ~~coast~~ Sitkan district is of general distribution, inland breeding mostly at high altitudes, and in both regions occurring in greatest abundance ~~during~~ at the beginning of the southward migration.

Nuthatch and ~~Titmice~~ Chickadees

Coast-

Interior

Sitta canadensis

Penthestes a. septentrionalis

Penthestes g. abbreviatus

Penthestes h. Columbianus

Penthestes r. rufescens

The vast difference between coast and interior is emphasized in the ~~Titmice~~ Chickadees perhaps more than in any other group of birds. This is evident in the paucity of species on the coast as compared with the interior, and in the nature of the differences between the most nearly related forms in the two regions. The Chestnut-backed Chickadee (the coastal species) is obviously an off-shoot from the same parental stock as the Hudsonian Chickadee of the interior. Whether or not the Chestnut-backed species

has been ~~xxxx~~ established in its present home for any very long period (and, as has been said, it does not seem as though the Sitkan district could have been habitable since extremely ~~any very~~ remote time), its strongly marked ~~differentiation~~ characters point to ~~rigid~~ absolute seclusion ~~isolation~~, upon the coast since its establishment there. The Hudsonian Chickadee has developed several rather weakly indicated subspecies in various parts of its wide habitat across sub-arctic North America, but here on the western coast, in rigid isolation, there is a strongly marked form, & a "species", as we insist; that is ~~probably of no greater~~ undoubtedly of the same ancestry and probably of no greater age.

The Chestnut-backed Chickadee, it may also be pointed out, is ~~almost the only~~ one of the few species of the Sitkan avifauna that is of recent Boreal derivation. Most of the ~~smaller~~ birds, the smaller ones especially, are from the south. The Chestnut-backed

Chickadee occurs inland up the ~~valley of the~~ Skeena valley at least to Hazelton, but not commonly.

The Hudsonian Chickadee is a common lowland species as far south as the Atlin region, mostly in the white spruce forests. Farther south, as about Hazelton, the Hudsonian Zone, to which this species belongs, climbs to higher altitudes, and the Chickadee breeds not lower than the 4000 foot level. It has nowhere penetrated to the coast. The Long-tailed Chickadee is a northern western variant of a species (Penthestes atricapillus) that in one form or another covers much of northern North America — the common Black-capped Chickadee, the Chickadee of the East. Throughout the interior of northern British Columbia it is a common and characteristic bird of the quaking aspen woods, shunning the denser spruce forests and ~~usually~~ remaining in the

valleys. It is of wide distribution farther northward, to the limit of trees in fact, but ~~its westward extension~~ extension to the west is halted abruptly by the Coast Range. It has nowhere reached the coast of southeastern Alaska.

The ~~Short-tailed~~ Mountain Chickadee ~~is~~ (occurring over much of North America west from the Rocky Mountains) is represented in British Columbia by a slightly differentiated variant. It is common in the southern part of the province, increasingly rare northward, but recorded from the upper Sheena Valley, the upper Stikine, and ~~near~~ at Atlin. This again is an inland species, ranging from northern British Columbia to southern California, but always back from the coast.

It is not possible to define exactly the status of the Canada Nuthatch. It occurs across the continent in the northern woods, but in the regions here discussed I have never found

it in summer in sufficient numbers anywhere to satisfy one that it was ~~any~~ a characteristic component of the avifauna of that section. I believe that it probably is better placed with the ~~inland~~ avifauna of the interior (where I have found occupied nests). In the Sithan district one or two of the birds have been seen when they might have been breeding, but no nests have been found and the species is assuredly rare there in the summer. It migrates rather commonly both on the coast and inland.

Solitaire, Thrushes and Bluebird

Coast-	Interior
	Myadestes townsendi
	Hylocichla a. aliciae
Hylocichla u. ustulata	Hylocichla u. swainsoni
Hylocichla g. nanus	Hylocichla g. guttata
Planesticus m. caurinus	Planesticus m. migratorius
Ixoreus n. naevius	Ixoreus n. meruloides
	Sialia currucoides

The group of thrushes supplies especially satisfactory examples of strongly differentiated but complementary subspecies on the coast and inland. The Olive-backed and Russet-backed thrushes and the Hermit Thrushes to a marked degree, and the Robins to a lesser extent, are excellent examples

of faunal variation. The Olive-backed Thrush ranges from the Atlantic coast northwestward into British Columbia and Alaska, so far as to leave only the narrowest possible coastal habitat for ~~the related~~ its Russet-backed ~~Thrush.~~ relative of the Sitkan district. It was found breeding along the Stikine to within forty miles of the coast, and, in further evidence of aggressive virility, in the upper Skeena Valley, where so many inland subspecies show distinct traces of characters of their coastal relatives, and where several coastal species have penetrated in some numbers, the Olive-backed Thrush retains its subspecific character unchanged. This seems to be one of the inland forms that is pressing toward the coast wherever ~~the~~ an opening affords. The Russet-backed Thrush, on the other

hand, also ~~strongly~~ abundant enough in its restricted coastal habitat, shows no inclination whatever to spread inland over the paths that one or two of its associates have followed. ~~The~~ Olive-backed ~~Thrush~~ and Russet-backed thrushes both are lowland birds, the Olive-backed is characteristic of the quaking aspen woods, of the willow thickets as second choice; the Russet-backed occupies the restricted marginal areas of alder and willow that border the dense Sitkan forests.

Of the Hermit Thrushes, the Alaska Hermit inland and the Dwarf Hermit coastwise replace one another faunally just as do Olive-backed and Russet-backed, with this additional inter-relation, that while the two last-mentioned are ~~primarily~~ occupants of deciduous woods the Hermit-Thrushes are primarily of the coniferous forests. The two inland species

differ markedly in migration routes. The Olive-backed Thrush travels southward east of the Rockies, down the Mississippi Valley and to a distant Central American winter home, while the Alaska Hermit Thrush is one of the few birds of the interior that migrates directly southward to pass the winter in California and other western states. From the Sitkan district the Russet-backed Thrush follows the coast southward to western Mexico, the Dwarf Hermit Thrush to the relatively nearby coast of California.

Among migrating Hermit Thrushes passing southward through the Cassiar and Uminaca districts, a few birds appear that are closely similar to the Eastern Hermit Thrush (Hylocichla guttata pallasi), with bright rufous back and tawny sides, others that are about intermediate between Eastern and Alaskan subspecies. These presumably come from some nesting ground to the northeast, a meeting ground of the two forms.

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The Gray-cheeked Thrush is in our list through the capture of two or three individuals in the Cassiar district. This bird in its astounding migrations traverses not only the diagonal length of North America from southeast to northwest, but some individuals even pass beyond Alaska into Siberia. This migration route barely includes the northwestern corner of British Columbia.

The Robin of the interior is not the Western Robin, as in southern British Columbia, ~~of the country to the southward~~, but is the Eastern bird. Its migration route, as with so many species of this section, must lie toward the southeast, crossing the Rockies somewhere north of central British Columbia. In the coastal region there is ~~a~~ another subspecies, the Northwest Coast Robin, that may well have been of direct and relatively recent derivation from the ~~interior form, the~~ Eastern Robin of the interior.

In the wide habitat of the Varied Thrush over western North America, two fairly well differentiated subspecies may be distinguished, one (naevius) in a narrow coastal strip from northern California to ~~the~~ southern Alaska, the other (meruloides) interiorly from Montana to northern Alaska. It is a

~~the northwestern coast of British Columbia.~~

rather remarkable fact that this bird appears to be absent as a breeding species from the Atlin and Telegraph Creek regions, although the interior form might be expected to occur there and does, in fact, pass through commonly in migration. Throughout ~~In~~ the Sitkan district the Coast Varied Thrush is a common and characteristic species.

~~Throughout~~ In the northwestern interior Townsend's Solitaire is of fairly general distribution, though nowhere common. This is a bird that has developed no peculiar local races in its extensive habitat in western North America, possibly through a tendency to avoid those regions that present climatic extremes of one sort or another, just as it stops short of the

boundaries of the extremely humid Sitkan district. ~~It is one of~~ It has, however, been taken there once or twice on migration, as at the mouth of the Stikine, occurrences of straggling individuals that give rise to speculative wonder as to whether they were timidly trying out an unpromising adventure, or were utterly lost and on the wrong tack.

The Arctic Bluebird justifies its name in pushing northward ~~still~~ through the interior of British Columbia and beyond into Yukon Territory and Alaska. ~~beyond.~~ It affords a bright bit of color that is always welcome, and it has, too, a pleasing predilection for human society. This is a species that ~~apparently~~ sends migrating contingents down the Taku and

Stikine rivers with some regularity in the fall,
and it would not be surprising to find it
resting eventually ~~in the~~ in congenial spots
at the mouths of those streams

Flycatchers

Coast	Interior
	Tyrannus tyrannus
	Sayornis s. yukonensis
Nuttallornis borealis	Nuttallornis borealis
Myiochanes r. richardsoni	Myiochanes r. richardsoni
Empidonax d. difficilis	Empidonax flaviventris
Empidonax t. alnorum	Empidonax t. alnorum
	Empidonax hammondi
	Empidonax wrighti

The Western Flycatcher is the only species of this assemblage that is characteristic of the Sitkan district, or even fairly common therein. This is a wide ranging species that occurs in unchanged appearance from Mexico to Alaska, but in the north, from southern British Columbia northward, it is rigidly confined to the narrow coastal strip, ~~and~~ and never seen inland. The characteristic and penetrating call-note of the Western Flycatcher is ~~often~~ to be heard ~~even~~ in the woods of even the westernmost of the ~~Alaskan~~ islands of the Alexander Archipelago, where it ~~is often~~ may be almost the only bird found to ~~be heard~~ break the stillness. The eastern prototype of the Western Flycatcher, the Yellow-bellied Flycatcher, has been taken once near Hazelton and once near Atlin, but it is apparently only a

straggler to these localities. Three other species of Empidonax fill the niches inland that are occupied by the Western Flycatcher on the coast.

Three other flycatchers, the Alder Flycatcher, Olive-sided Flycatcher and Western Wood Pewee, (all decidedly rare) have been found at ~~two or three~~ several points on the mainland coast of Alaska, but, although they may breed regularly at such places, these birds merely represent extreme outposts of the species that have been extended from the interior habitat through favorable avenues into the confines of the wet belt. Their presence there, however, may hold a promise of a future wider range.

The eastern prototype of the Western Flycatcher, the Yellow-bellied Flycatcher, has been taken once near Hazelton and once near Atlin, but it is apparently only a straggler so far to the westward. ~~to these localities.~~ Three other species of Empidonax fill the niches inland that are occupied by the Western Flycatcher on the coast. The Alder Flycatcher occupies the willow thickets of the lowlands (in the absence of alders in much of the interior, perhaps), and the Hammond (commonly) and Wright's (rarely), the heavier woods.

The Western Wood Pewee, too, is common in the more

open lowland woods, and the Olive-sided Flycatcher, though not abundant, is of general distribution throughout the interior. The Say's Phoebe, ~~abundant~~ nowhere common, is almost sure to be found about human habitations, occupied or abandoned, to points far north of the regions here considered. The Eastern Kingbird reaches its northwestern confines about Hazelton, where it is of extreme rarity.

In more southern regions Horned Larks are found exclusively in the lowlands, characteristic birds of prairie, field and pasture. In the forested sub-arctic regions ~~north land~~ the only suitable open country for the Horned Larks lies above timber line, and this means as a rule the ridges and plateaus of the higher mountains. The Pallid Horned Lark (Otocoris alpestris arcticola) is found throughout the interior in Alpine surroundings, an associate or a neighbor of the Rock Ptarmigan, ~~Pipit~~, and the Mountain Sheep.

~~Golden-crowned Sparrow and Timberline Sparrow~~

It is not known to occur anywhere in the Sitkan district.

~~The~~ Magpie, Jays, Crows and Blackbirds

Coast	Interior
	Pica p. hudsonia
Cyanocitta s. stelleri	Cyanocitta s. annectens
	Perisoreus c. canadensis
Corvus c. principalis	Corvus c. principalis
Corvus caurinus	Corvus b. hesperis
	Euphagus carolinus

Distribution and migrations of the Magpie in the region we are considering ~~northwest~~ are not well understood, but, although it reaches the coast far to the northwest of this section, ~~the region we are considering~~, here, and from here northward, it is emphatically a species of the interior. The Magpie ~~It~~ breeds at Carcross, but is not known to do so near Atlin, Telegraph Creek or Hazelton, though ~~but~~ I believe that at all these points (at Atlin certainly) it turns up pretty regularly in the late summer. At this time, too, it wanders down the Taku and Stikine rivers to the coast.

Steller's Jay is a characteristic and conspicuous inhabitant of the coastal region from Vancouver Island to Juneau, ~~It is~~ a northern variety of a wide-spread species that, in various local forms, occupies much of the Pacific

The crested jays of the genus Cyanocitta are American in origin and must have invaded Alaska and British Columbia from the south. In western North America there are two rather widely divergent strains, on the one hand the several subspecies that occupy the Sierra Nevada and Coast-Ranges, which have no white markings above the eye; on the other, the Rocky Mountain races, which have such markings. The Rocky Mountain subspecies, annectens and diademata, are northern links of a connected chain extending south through Mexico into Central America. The coastal subspecies almost form an isolated group, widely separated from the Rocky Mountain strain at the south, but with some degree of junction at the north. In British Columbia there is geographic approach coupled with evident intergradation. Existing conditions suggest that the Pacific coast subspecies are the result of a "back-wash" in distribution, a southward advance in the Coast-Ranges and Sierra Nevada, accomplished from some point or points on the northern coast. The ancestral Cyanocitta may be supposed to have passed upward from Mexico to its farthest north in the interior, to have eventually

reached the coast, and then have found its way southward in congenial surroundings that were otherwise unattainable. The Alaskan coast, now occupied as far as Cook's Inlet, the northernmost point reached by the genus, was probably colonized last in the history of the movement.

Steller's Jay is a characteristic and conspicuous inhabitant of the coastal region from Vancouver Island to Cook's Inlet. In the northern interior of British Columbia is another subspecies, the Black-headed Jay, which reaches its northern limit in the Skeena Valley. The Jay population of the Hazelton region, 200 miles from the coast, shows a strong admixture of Steller Jay characteristics; fairly typical examples of the Black-headed Jay have been taken ~~as far up the mouth~~ as far as the mouth of the Skeena River, and even beyond, on the nearby Porcher Island, in the coastal

habitat of the Steller's Jay. So, at the mouth of the Skeena there is a break in the ~~distribute~~ north-and-south distribution of the bird we call Cyanocitta stelleri, due to the interposition of the annectens stream. In mediately to the southward, on the Queen Charlotte Islands, is the extremely dark-colored subspecies, carlottae. Farther south, on Vancouver Island, ~~the birds are like the Rocky~~ ~~Mts~~ and farther south, on the Oregon coast, the birds are less dark, and these two separated but superficially similar strains are classified under the same name. It is a situation that can not be adequately met by our system of nomenclature.

In the intergradient population between the interior and the coast, the jays of these species present a different situation from

that seen in some other groups, such as the two subspecies of the thrush, Hylocichla ustulata. In that case the two subspecies ustulata and swainsoni meet as distinct species, without intergrading, suggesting that they have approached and met after long separation. The condition in the Steller Jay variant, with intergradation in intermediate territory, (through the ages; and) suggests uninterrupted communication; it suggests to my mind the northward, then southward, movement of the populations that is outlined above.

slope, the Rocky Mountain region, and the Mexican plateau. In the southern interior of British Columbia is another subspecies, the Black-headed Jay, which reaches its northern limit in the Skeena ~~River~~ Valley. The Jay population of the Hazelton region (200 miles from the coast), ~~about~~ while ~~most nearly~~ of the Black-headed variety in average appearance, a strong admixture of Steller Jay shows ~~clearly enough the a much closer approach to the~~ characteristics. Most of the birds are "intermediate," as the technical term goes; on the other hand, ~~and fairly individuals that were fairly~~ typical examples of the Black-headed Jay have been taken quite to the mouth of the Skeena River, in the coastal ~~habitat of the Steller Jay.~~

The Canada Jay is a Boreal species that is transcontenental in its distribution, save that it, again, is stopped within sight of the Pacific coast by the ~~one~~ barrier of the Coast Range. It is unknown to the Sitkan district. South as far as the Stikine River the Canada Jay is a dweller of the lowlands as well as of the mountain sides. Farther south, toward Hazelton, it apparently does not breed in the valleys, but only in the Hudsonian zone of the higher slopes, descending ~~again~~ therefrom at the end of the summer.

There is another coastal species, the Kadiak Pine Grosbeak, that has been found in summer in the upper Stikine Valley, possibly a parallel occurrence to the Song Sparrow. ~~The~~ Distribution and manner of occurrence of the several subspecies of the Pine Grosbeak in the northwest are imperfectly known, but it looks as though there were a coastal form, not at all common in the Sitkan district, that may stretch inland for some distance up such valleys as the Stikine. The Alaska Pine Grosbeak (the subspecies of the northern interior) ~~does~~ is not known to breed even as far south as the Atlin region.

There are different subspecies of Savannah Sparrow that replace one another most satisfactorily inland and on the coast; the gray-colored, slender-billed Western Savannah Sparrow throughout the interior, the brown-colored, stubby-billed Kadiak Savannah Sparrow in the Sitkan district. Similarly, Lincoln's Sparrow (inland) and Forbush's Sparrow (coastal) are complementary in their distribution.

In the group of Juncos we are here at the meeting point of three distinct forms, Cassiar Junco, Shufeldt's Junco, and Oregon Junco. The Slate-colored Junco,

the prevalent form of eastern and northern North America, occurs over most of Alaska, north of our region, but in the Athi and Stikine territories
~~Cassiar region~~ it is represented by a slightly different subspecies, the Cassiar Junco, a rather curious variant. In this bird the male is closely similar to the male Slate-colored, to the northward, while the female is closely similar to the female Shufeldt's Junco, to the southward. In their southern winter habitat male and female of the Cassiar Junco ~~have~~ without doubt have been many times recorded as, respectively, of those two species. The Cassiar Junco, part of the Slate-colored aggregation, represents ~~the~~ an extreme western outpost of that wide-spread species. ~~(primarily of eastern North America).~~ ~~The~~ Shufeldt's Junco, of interior British Columbia north to the Skeena Valley, and the Oregon Junco, of the Sitkan district, are closely related subspecies of the black-headed Oregon Junco aggregation, which occupies the Pacific slope from southeastern Alaska south into northern Lower California. ~~Where~~ At the meeting point of Shufeldt's and Oregon Juncos ~~meet~~ in the Skeena Valley, of Shufeldt's and Cassiar Junco a little farther north, and of Cassiar Junco and Oregon Junco on the lower Stikine, there are produced some

birds that are
curiously and variously "intermediate" in their characters of color and markings, fearfully puzzling things to the systematist when they reach his hands from some far southern winter resort, with no clue as to their place of origin.

In the Fox Sparrows (Passerella) conditions are the reverse to those in the Juncos, in that there is just one subspecies inland, the pale colored Alberta Fox Sparrow, and two subspecies in different parts of the coast, the extremely dark colored Sooty and Townsend Fox Sparrows. The Alberta Fox Sparrow occurs northward to the Skeena drainage, where it occupies the Hudsonian zone on the higher mountains. Curiously, there is a gap throughout the Stikine and Atlin countries (the Cassiar region) where apparently no form of Fox Sparrow occurs, a wide gap between the ranges of the Alberta Fox Sparrow and the boreal Eastern Fox Sparrow, which is found from the Atlantic coast westward throughout northern Alaska. It seems a parallel case to that of the Pine Grosbeaks.

The northern Raven is much like the Bald Eagle in its associational preferences, being abundant everywhere along the coast and decidedly rare in the interior. It is, of course, transcontinental (circumpolar, in fact), in its general distribution, but there is the decidedly noticeable local ~~difference~~ contrast here, of ubiquitous presence ~~too~~ in the Sitkan littoral, ~~(and outward),~~ and marked scarcity east of the coast-range.

~~The Northwest Crow is a beach comber~~

The habitat of the Northwest Crow is ~~defined in~~ implied in the one term, "beach comber"; ~~It is~~ it is almost never seen out of sight of salt water. Along the British Columbian and Alaskan coast every bay and inlet has its gaggle of Crows searching the mud flats and beaches, north throughout the Sitkan district. The Western Crow (a slightly distinguished western variety of the common American Crow) occurs in the interior valleys of British Columbia north to the vicinity of Hazelton, but nowhere in this region is it known to reach the coast.

The common northern representative of the blackbird tribe is the Rusty Blackbird. This is

another wide-spread species ~~that~~ ranges <u>almost</u> across the continent, blocked off, as are so many others, from the last few miles between the Coast Range and the sea. It is found throughout the lowlands of the Cassiar and Omineca districts, and ~~it~~ breeds along the Stikine to within a hundred miles of the coast, but it is only an occasional straggler that wanders ~~into~~ down to the river's mouth at the end of the summer. The southward migration of the Rusty Blackbird is noticeably to the eastward, east of the Rocky Mountains. Very few stray directly south into southern British Columbia.

(wide spacing)

The Western Belted Kingfisher (Ceryle alcyon caurina)
is a very slightly differentiated ~~race~~ western subspecies of a
wide-ranging North American bird, notable in that ~~and~~ it occurs in equal
numbers ~~inland~~ and in unchanged appearance, inland and
on the coast.

(wide spacing)

Woodpeckers

Coast	Interior
	Dryobates v. septentrionalis
Dryobates v. sitkensis	Dryobates v. monticola
	Dryobates p. nelsoni
Dryobates p. leucurus X	Dryobates p. leucurus
	Picoides arcticus
Picoides a. fasciatus	Picoides a. fasciatus
	Sphyrapicus v. varius
Sphyrapicus ruber	Sphyrapicus ruber
	Phloeotomus p. picinus
Colaptes c. cafer	Colaptes a. borealis

The family of the woodpeckers is well represented in the northern woods, and there are various species that are characteristic of, and fairly common in, the several regions here considered. The wide-spread Hairy Woodpecker occurs as three subspecies, the large Northern Hairy Woodpecker ~~rather rare in the northern~~ has its southern limit in the Atlin region, where it is rather rare. The Rocky Mountain Hairy Woodpecker reaches its northern limit in the valley of the Stikine, and ~~from~~ it is fairly abundant from that region southward. The Sitka Hairy Woodpecker is confined to the Sitkan district. All three of these ~~birds~~ are white-breasted birds, as distinct from the sooty-breasted subspecies to the southward. It is a noteworthy fact that the Sitka ~~Hairy~~ Woodpecker is an offshoot of the interior Rocky Mountain Hairy Woodpecker, and not ~~so~~ closely related to the dark colored Harris' Woodpecker of the coast of southern British Columbia, with which it was once thought to be ~~identical~~ identical. The avifauna of the Sitkan district is mostly derived from

the coast to the southward, but there are some elements, and this woodpecker is one of them, that unquestionably had their origin in the adjacent hinterland to the eastward.

Conditions in the Hairy Woodpecker group are practically duplicated in the smaller Downy Woodpecker. The northern Nelson's Downy Woodpecker occurs, but is not common, in the Atlin region, its southern limit. I saw no Downy Woodpecker in the Stikine Valley, though the species must occur there, but found the Rocky Mountain Downy Woodpecker to be fairly numerous Common in the Skeena Valley, and it is a common bird from there southward. This subspecies, too, reaches the coast of the Sitkan district, and even farther westward to Prince William Sound, but not in any numbers and perhaps only as a migrant or wanderer. (paralleling the non-occurrence of the Hairy Woodpecker). Again, the dark colored Gairdner's Downy Woodpecker, of the coast of southern British Columbia, does not extend northward into the Sitkan district. So that, while the Hairy Woodpecker of the interior has established a "colony" on the coast, which has been there long enough to develop distinguishable characters of its own, the Downy Woodpecker appears to be still at an earlier

stage, with only a few adventurous explorers trying out the more nearly adjacent portion of a region (perhaps, that as yet ~~is~~ but poorly adapted to the species' needs) may in time be thoroughly colonized.

In the Three-toed Woodpeckers, the Arctic or Black-backed (despite its name the most southern species of the group), wide-spread across North America and far south in the Rocky Mountains and Sierra Nevada, occurs throughout the interior but has not yet been found upon the coast. The Alaskan Three-toed Woodpecker (a subspecies of the American or Saddler-backed) is fairly common inland, and, like the Hairy Woodpecker of the same section, has established a precarious foothold in the Sitkan district, where it has been seen once or twice.

The Red-breasted Sapsucker is a Pacific coast species, in California ranging from the west-slope of the Sierra Nevada westward, and extending northward in a narrowing coastal strip to its northern limit in the Sitkan district. A coastal bird for the most part, it ranges inland up the Stikine River barely to the east side of the mountains, and no farther. In the broad Skeena Valley conditions are different, and the Red-breasted

Sapsucker is common ~~bird~~ there eastward to Hazelton and beyond, one of the very few coastal birds that are establishing themselves far from their normal habitat. The Yellow-bellied Sapsucker of eastern North America has been found at Telegraph Creek, apparently the extreme northwestern point to which it has attained.

The Flickers in their distribution present several features worth dwelling upon. The range of the Yellow-shafted Flicker of eastern North America (from the Rocky Mountains eastward in the United States), here in the northwest reaches westward to the east base of the Coast-Range, only a few miles from the coast. The range of the Red-shafted Flicker of western North America (from the Rocky Mountains westward in the United States) is here correspondingly narrowed to the attenuated coastal strip comprising the Sitkan district. As these two species are known to hybridize rather freely where conditions permit, the fact that ~~over much~~ throughout the Cassiar district and over most of the Sitkan district their specific characters are retained in all purity is a strong testimony to the efficacy of the faunal barrier between.

In the Skeena Valley of the Omineca district

conditions are different. As shown from other ~~testimon~~ evidence, coastal conditions, much modified, extend far ~~the~~ inland up this broad valley, and the Flickers give ~~testimony~~ witness to this also. The Yellow-shafted Flicker is the species of the Hazelton region, (200 miles inland,) but practically the whole Flicker population of that section, shows traces of Red-shafted ancestry. There are almost none of pure blood. There is a notable contrast between the appearance of the mongrel breeding stock (predominantly Yellow-shafted in character, however), and the pure blooded birds that appear from the north in the fall migration. Then, on Revillagigedo Island, Alaska (~~not~~ immediately north of the mouth of the Stikeen River), in the habitat of the Red-shafted Flicker, I once took a pair of breeding ~~Flickers~~ birds the male of which was a hybrid but predominantly of yellow-shafted characters. There is, however, apparently far more invasion of the Red-shafted species inland than of the Yellow-shafted species toward the coast.

The big Pileated Woodpecker, transcontinental in distribution and ranging over Vancouver Island in southern British Columbia, here in the north does not extend west of the Coast-Range. It occurs northward regularly to the Skeena River and occasionally even to the vicinity of Telegraph Creek. It is of interest here merely as being at the extreme northwestern corner of its entire habitat, checked apparently by the barrier of the Coast-Range.

Finches, Sparrows

Coast	Interior
	Hesperiphona v. brooksi
	Pinicola e. alascensis
Pinicola e. flammula	Pinicola e. flammula
	Carpodacus p. purpureus
Loxia c. minor	Loxia c. bendirei
	Loxia leucoptera
Leucosticte t. littoralis	
	Acanthis l. linaria
Spinus p. pinus	Spinus p. pinus
Passerculus s. anthinus	Passerculus s. alaudinus
	Zonotrichia gambeli
	Zonotrichia coronata
	Zonotrichia albicollis
	Spizella m. ochracea
	Spizella p. passerina
	Spizella taverneri
Junco o. oreganus	Junco h. connectens
	Junco o. shufeldti
Melospiza m. morphna	Melospiza m. morphna
Melospiza m. rufina	
Melospiza l. gracilis	Melospiza l. lincolni
Passerella i. townsendi	Passerella i. ~~altivagans~~ altivagans
Passerella i. fuliginosa	

An outstanding feature of the comparative lists of Finches and Sparrows is the far greater number of species in the interior. There is just one bird, the Pine Siskin, that is found in abundance, and unchanged in appearance, ~~throughout~~ Throughout its wide habitat in both regions. The Pine Siskin pays some attention to ~~the~~ Zonal ~~boundaries~~ limits. (it is mostly of the Canadian and Hudsonian life zones), but the boundaries of faunal areas are commonly ignored, here as elsewhere.

There is no fringilline species characteristic of the interior that breeds also upon the coast. One ~~coastal~~ species that is primarily of the coast, the Rusty Song Sparrow, is widespread over the southern half of British Columbia. Even as far north as the Skeena River it extends far inland, and in abundance. On the next large stream to the north, the Stikine, the Song Sparrows numbers are greatly lessened, and, although it occurs upstream ~~inland~~ as far as Telegraph Creek, it is only in small and scattered colonies at exceptionally ~~favored~~ favorable localities. This is about the northern limit of the species inland, though along the coast Song Sparrows, in one form or another, extend much farther, though west- rather than north, even to the Aleutian Islands.

There are two finches that in small numbers extend ~~to~~ northward this far from more southern centers of abundance. The Evening Grosbeak, common in places in the southern interior of British Columbia, ranges north to the vicinity of Hazelton. It has never reached the Alaskan coast. The Eastern Purple finch (extending westward from the Atlantic coast) is not uncommon in the Hazelton region (the Almineca district), it is decidedly rare in the upper Stikine Valley, and little more than a straggler to Atlin, the northernmost point at which it has been taken. It is worth noting that the western subspecies of the Purple Finch, the California Purple Finch, is found on Vancouver Island and ~~on a belt of the southwestern~~ the adjacent mainland coast, but that in British Columbia the boundaries of these two subspecies are nowhere known to approach within ~~several~~ a hundred miles of each other.

Of the Crossbills, the small American Crossbill is common in the Sitkan district; ~~and~~ the large Bendire's Crossbill (not common) ~~occurs~~ has been found about Atlin and Telegraph Creek, and undoubtedly occurs,

though probably erratically, as Crossbills do, from those points southward throughout the interior. There is a curious quirk in distribution here, in that the bird of the Sitkan (it occurs south into California along the coast) district, is indistinguishable from the common Crossbill of eastern North America, though the habitat of Bendire's Crossbill intervenes between the two.

The White-winged Crossbill is the common species of the interior. It migrates in winter into the Sitkan district, and I believe that, in some seasons, at least, it may nest along the mainland coast. I have found it obviously doing so, though no nests were discovered, along the Stikine within thirty miles of the river's mouth. As a point in local distribution, the Red Crossbill of the interior (Bendire's Crossbill), inland, occupies the stands of Jack Pine (Pinus contorta), while the White-winged Crossbill of the same region is just as rigidly confined to the White Spruce (Picea canadensis). The Red Crossbill of the coast (the American Crossbill) has no extensive Jack Pine woods

to resort to, and cheerfully occupies the spruce forest.

It seems curious that the Red Crossbill should be of more northern distribution than the White-winged, for our several ~~~~ American ~~~~species of the Red Crossbill are but slightly differentiated variants of a species that extends also across Northern Asia and Europe, and ~~that~~ they, therefore, might be expected to range as far north in this continent as could any member of the genus.

The Common Redpoll, transcontinental in habitat, is an inland species, ~~primarily~~, probably altogether of the interior during the nesting season. It is known to nest only as far south as the Atlin region. Occurrences in the Sitkan district are merely of transient flocks.

Hepburn's Rosy Finch is a coastal variety of a species that is widespread over the higher mountains of the northwest, and probably occurs wherever conditions are favorable above timberline throughout the Sitkan district, on islands and mainland. It has been found in summer on the eastern face of the Coast Range in the upper reaches of the Stikine, ~~and on the upper Skeena River~~ and on a mountain near Hazelton, on the upper Skeena River. The Gray-crowned Rosy Finch, its analogue in the interior, although known from localities to the southeast and to the northwest, ~~of the region we are considering~~, has not been found in the region we are here considering.

The White-throated Sparrow is primarily of eastern North America, but has been found in the vicinity of Hazelton, apparently its extreme northwestern limit. The other Crown Sparrows, Gambel's and the Golden-crowned, are characteristic and abundant species in the interior of the northwest, Gambel's in the lowlands, the Golden-crowned at high altitudes. Gambel's Sparrow frequents the thickets of willow, wild rose, or the various berry bushes, at the edges of the woodlands, the Golden-crowned the willow-bordered brooks and the balsam thickets above timber-line. Both are emigrants through

the Sitkan district, in fair abundance along the mainland coast, rather rare on the outer islands. Both of these birds are peculiar in their occurrence in the interior of the northwest, especially so the Golden-crowned, in that they are western species, primarily of the Pacific slope, and in their summer habitat they are ~~almost unique as such~~ part of ~~in~~ a population composed ~~chiefly~~ mostly of eastern and boreal ~~birds~~ residents. ~~Other~~ There are ~~very few other~~ not many exceptions ~~that~~ to the general rule that Pacific slope species in ~~the~~ far northern migration remain west of the coast ranges.

The Western Tree Sparrow, sub-arctic in habitat and, as a species, extending across the continent, finds its southern breeding limit in the Cassiar district. ~~It does not breed~~ It is not known to nest south of the Stikine. In the Atlin and Stikine sections it is a timberline bird, frequenting the willow-thickets along brooks and lakelets above the forest-level. If it reaches the coast at all it is as a scarce migrant. The closely related Chipping Sparrow, common throughout the interior, is the Eastern variety, and not the Western Chipping Sparrow found west of the Rockies farther south. It is a lowland bird, does not cross the Coast-Range anywhere, and

in southward migration swings east of the Rocky Mountains before ~~central British Columbia~~ the United States boundary is reached.

(1924)

A recent addition to the North American bird list is the Timberline Sparrow, a Spizella that is closely similar to Brewer's Sparrow of the sage-brush deserts of the Great Basin. The Timberline Sparrow has thus far been found in summer only in the Atlin region, where it occurs ~~only~~ at relatively high elevations, in the regions occupied also by Rock Ptarmigan, Golden-crown Sparrow, and Horned Lark. It occupies mostly a higher level than the Tree Sparrow, of the same genus, and has not been detected in the lowlands even in migration. Nothing is known of its ~~winter~~ distribution in winter, and only one or two migrants have been collected, in southern British Columbia and ~~northern~~ in Montana.